

Soil Survey Laboratory Data and Descriptions for Some Soils of...

•• WISCONSIN

SOIL CONSERVATION SERVICE • U.S. DEPARTMENT OF AGRICULTURE

In cooperation with Research Division of the College of
Agricultural and Life Sciences, University of Wisconsin

Soil survey investigations reports already published:

SSIR No. 1 Soil Survey Laboratory Methods and Procedures for
Collecting Soil Samples

Soil Survey Laboratory Data and Descriptions for
Some Soils of:

SSIR No. 2	North Dakota
SSIR No. 3	Iowa
SSIR No. 4	Kansas
SSIR No. 5	Nebraska
SSIR No. 6	Arkansas, Louisiana, and Missouri
SSIR No. 7	Montana
SSIR No. 8	Wyoming
SSIR No. 9	Minnesota
SSIR No. 10	Colorado
SSIR No. 11	Oklahoma
SSIR No. 12	Puerto Rico and the Virgin Islands
SSIR No. 13	Mississippi
SSIR No. 14	Kentucky
SSIR No. 15	Tennessee
SSIR No. 16	North Carolina, South Carolina, and Georgia
SSIR No. 17	Wisconsin
SSIR No. 18	Indiana
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SSIR No. 20	New England States
SSIR No. 21	A Toposequence of Soils in Tonalite Grus in the Southern California Peninsular Range

Soil Survey Laboratory Data and Descriptions for
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November 1979

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PREFACE

The Soil Survey Investigations Report (SSIR) Series was established to preserve and make available technical information resulting from soil survey investigations. SSIR No. 1, "Soil Survey Laboratory Methods and Procedures for Collecting Soil Samples," revised April 1972, describes in detail the methods used in the soil survey laboratories. One report involves a single specific study. Other reports in the series contain pedon descriptions and data from the individual states and Puerto Rico and the

This report contains pedon descriptions and data obtained in Wisconsin from 1948 to 1975. The majority of laboratory analyses were conducted at the Soil Survey Laboratory, Lincoln, Nebraska.

Laboratory data for different soils cannot always be compared without allowance for the method. Methods are indexed by code or footnote in data sheet column headings and are identified briefly on the following two pages. Detailed explanations of coded procedures are in SSIR No. 1.

Many of the soil descriptions were prepared as working documents, not necessarily for publication. Some contain unusually detailed information pertinent to specific soil survey investigations. Such information, including older concepts of soil series, relationships among pedons, and field estimates of properties, is useful in a publication of this type. Editing is, therefore, minimal with emphasis toward preservation of descriptive data.

Many pedons no longer represent the soil series with which they were originally identified; a few represent series being considered for reclassification. All were checked against the series classification list. Some pedons are called taxadjuncts to series. All pedons are classified to the family level. In the taxonomic and geographic indexes pedons are arranged by taxonomic unit.

METHODS CODE SYMBOLS

1. SAMPLE COLLECTION AND PREPARATION
 - A. Field sampling
 1. Site selection
 2. Soil sampling
 - a. Stony soils
 - b. Marsh and swamp soils
 - B. Laboratory preparation
 1. Standard (airdry)
 - a. Square-hole 2-mm sieve
 - b. Round-hole 2-mm sieve
 2. Field moist
 3. Carbonate-containing material
 4. Carbonate-indurated material
2. CONVENTIONS
 - A. Size-fraction base for reporting
 1. < 2-mm
 2. < size specified
 - B. Data sheet symbols

tr: trace, not measurable by quantitative procedure used or less than reportable amount

blank: analysis not run
3. PARTICLE-SIZE ANALYSES
 - A. Particles <2-mm (pipet method)
 1. Airdry samples
 - a. Carbonate and noncarbonate clay
 - b. Fine clay
 - B. Particles >2-mm
 1. Weight estimates
 - a. By field and laboratory weighing
 - b. From volume and weight estimates
 2. Volume estimates
4. FABRIC-RELATED ANALYSES
 - A. Bulk density
 1. Saran-coated clods
 - a. Field state
 - b. Airdry
 - c. 30-cm absorption
 - d. 1/3-bar desorption I
 - e. 1/3-bar desorption II
 - f. 1/3-bar desorption III
 - g. 1/10-bar desorption
 - h. Ovendry
 - B. Water retention
 1. Pressure-plate extraction (1/3 or 1/10 bar)
 - a. Sieved samples
 - b. Soil pieces
 - c. Natural clods
 2. Pressure-membrane extraction (15 bars)
 - a. Field-moist samples
 3. Sand-table absorption
 4. Field state
 5. Airdry
 - C. Water-retention difference
 1. 1/3 bar to 15 bars
 2. 1/10 bar to 15 bars
 - D. Linear extensibility
 1. Dry to moist
 - E. Micromorphology
 1. Thin sections
 - a. Preparation
 - b. Interpretation
 - c. Moved-clay percentage
 - F. Plasticity index
 1. Liquid limit
 2. Upper plastic limit
5. ION-EXCHANGE ANALYSES
 - A. Cation-exchange capacity
 1. NH_4OAc , pH 7.0
 - a. Direct distillation
 - b. Displacement, distillation
 3. Sum of cations
 - a. Acidity by BaCl_2 -TEA, pH 8.2; bases by NH_4OAc , pH 7.0
 - b. Sum of bases plus Al
 6. NH_4OAc , pH 7.0 leaching tube
 - a. Direct distillation
 - B. Extractable bases
 1. NH_4OAc extraction
 - a. Uncorrected
 - b. Corrected (exchangeable)
 - c. See 5B4
 2. KCl -TEA extraction, pH 8.2
 3. KCl -TEA, pH 8.2 (revised)
 - a. Uncorrected
 - b. Corrected (exchangeable)
 4. NH_4OAc , pH 7.0 (modified)
 - a. Uncorrected
 - b. Corrected (exchangeable)
 - C. Base saturation
 1. NH_4OAc , pH 7.0
 3. Sum of cations
 - E. Sodium-adsorption ratio
 - F. Calcium saturation
 1. NH_4OAc , pH 7.0
6. CHEMICAL ANALYSES
 - A. Organic carbon
 1. Acid-dichromate digestion
 - a. FeSO_4 titration
 - b. CO_2 evolution, gravimetric
 - B. Nitrogen
 1. Kjeldahl digestion
 - a. Ammonia distillation
 - C. Iron
 1. Dithionite extraction
 - a. Dichromate titration
 - b. EDTA titration
 2. Dithionite-citrate extraction
 - a. Orthophenanthroline colorimetry
 - b. Atomic absorption
 3. Dithionite-citrate-bicarbonate extraction
 - a. Potassium thiocyanate colorimetry
 4. Pyrophosphate-dithionite extraction
 5. Sodium-pyrophosphate extraction
 - a. Atomic absorption
 6. Ammonium oxalate extraction
 - a. Atomic absorption
 - E. Calcium carbonate
 1. HCl treatment
 - b. Manometric
 - e. Titrimetric
 2. Sensitive qualitative method
 - a. Visual, gas bubbles
 3. H_2SO_4 treatment
 - a. Weight gain
 - F. Gypsum
 1. Water extract
 - a. Precipitation in acetone
 - b. Indirect estimate
 - G. Aluminum
 1. KCl extraction I, 30 min.
 - d. Fluoride titration
 - e. Atomic absorption
 5. Sodium pyrophosphate extraction
 - a. Atomic absorption
 6. Ammonium oxalate extraction
 - a. Atomic absorption
 7. Dithionite-citrate extraction
 - a. Atomic absorption
 - H. Extractable acidity
 1. BaCl_2 -triethanolamine I
 - a. Back-titration with HCl
 2. BaCl_2 -triethanolamine II
 - a. Back-titration with HCl
 - I. Carbonate
 1. Saturation extract
 - a. Acid titration
 - J. Bicarbonate
 1. Saturation extract
 - a. Acid titration
 - K. Chloride
 1. Saturation extract
 - a. Mohr titration
 - b. Potentiometric titration
 - L. Sulfate
 1. Saturation extract
 - a. Gravimetric, BaSO_4
 - b. EDTA titration

6. CHEMICAL ANALYSES (cont.)

M. Nitrate

1. Saturation extract
 - a. PDS acid colorimetry
 - b. Diphenylamine

N. Calcium

1. Saturation extract
 - a. EDTA titration
 - b. Atomic absorption
2. NH_4OAc extraction
 - a. EDTA-alcohol separation
 - b. Oxalate-permanganate I
 - c. Oxalate-permanganate II
Fe, Al, and Mn removed
 - d. Oxalate-cerate
 - e. Atomic absorption
4. KCl-TEA extraction
 - a. Oxalate-permanganate
 - b. EDTA titration
 - c. Atomic absorption

O. Magnesium

1. Saturation extract
 - a. EDTA titration
 - b. Atomic absorption
2. NH_4OAc extraction
 - a. EDTA-alcohol separation
 - b. Phosphate titration
 - c. Gravimetric, $\text{Mg}_2\text{P}_2\text{O}_7$
 - d. Atomic absorption
3. NH_4Cl -EtOH extraction
 - a. EDTA titration
4. KCl-TEA extraction
 - a. Phosphate titration
 - b. EDTA titration
 - c. Atomic absorption

P. Sodium

1. Saturation extract
 - a. Flame photometry
 - b. Atomic absorption
2. NH_4OAc extraction
 - a. Flame photometry
 - b. Atomic absorption

Q. Potassium

1. Saturation extract
 - a. Flame photometry
 - b. Atomic absorption
2. NH_4OAc extraction
 - a. Flame photometry
 - b. Atomic absorption

R. Sulfur

1. NaHCO_3 extract, pH 8.5
 - a. Methylene blue
2. HCl release (sulfide)
 - a. Iodine titration

S. Total phosphorus

1. Perchloric acid digestion
 - a. Molybdovanadophosphoric
acid colorimetry

7. MINERALOGY

A. Instrumental analysis

1. Preparation
 - a. Carbonate removal
 - b. Organic-matter removal
 - c. Iron removal
 - d. Particle-size fractionation
 - e. PSDA pretreatment
 2. X-ray diffraction
 - a. Thin film on glass, solution pretreatment
 - b. Thin film on glass, resin pretreatment
 3. Differential thermal analysis
- B. Optical analysis
1. Grain studies
 2. Electron microscopy
- C. Total analysis
1. Chemical
 2. X-ray emission spectrography
- D. Surface area
1. Glycerol retention

8. MISCELLANEOUS

A. Saturated paste, mixed

1. Saturation extract
 - a. Conductivity
 - b. Conductivity, quick test
2. Conductivity, saturated paste

B. Saturated paste, capillary rise

1. Saturation extract
 - a. Conductivity

C. pH

1. Soil suspensions
 - a. Water dilution
 - b. Saturated paste
 - c. KCl
 - d. NaF
 - e. CaCl_2

D. Ratios and estimates

1. To total clay
2. To noncarbonate clay
3. Ca to Mg (extractable)
4. Estimated clay percentage
5. Estimated total salt

E. Soil resistivity

1. Saturated paste

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<u>Typic Glossaqualf</u>		<u>Glossic Eutroboralf</u>	
Fine-silty, mixed, frigid		Coarse-loamy, mixed	
Auburndale silt loam <u>7/</u>	21*	Alban taxadjunct	7
Auburndale silt loam	23*	Amery taxadjunct	13
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<u>Aeric Glossaqualf</u>			
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Withee silt loam	225*		
Fine-silty, mixed, frigid		Fine, mixed	
Almena silt loam <u>3/</u>	9*	Hibbing taxadjunct	65
Almena silt loam	11*		
Almena silt loam	13*	Very-fine, mixed	
		Ontonagon	103
Fine, mixed, frigid		Ontonagon	105
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<u>OCHRAQUALF</u>		<u>GLOSSOBORALF</u>	
<u>Typic Ochraqualf</u>		<u>Typic Glossoboralf</u>	
Coarse-loamy, mixed, frigid		Coarse-loamy, mixed	
Cable taxadjunct	31	Amery series <u>4/</u>	111*
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<u>Aeric Ochraqualf</u>			
Fine-loamy, mixed, frigid		Fine-loamy, mixed	
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		Santiago silt loam	199*
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Coarse-loamy, mixed		Otterholt silt loam	135*
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		Otterholt silt loam	139*
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Fine-loamy, mixed			
Rietbrock taxadjunct	111	Fine-loamy over sandy or	
		sandy-skeletal, mixed	
		Onamia loam	123*
		Fine-silty over sandy or	
		sandy-skeletal	
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Stambaugh taxadjunct	125	Pardeeville loam	153*
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Arland silt loam 6/	15*	Sandy, mixed, mesic	
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<u>Typic Hapludalf</u>		Coarse-loamy, mixed, mesic	
Coarse-loamy, mixed, mesic		Billett taxadjunct 9/	101*
Mecan loamy sand	97*	Billett taxadjunct 9/	103*
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		Billett taxadjunct 9/	107*
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Seaton taxadjunct 31/	209*	Boone sand	25*
		Boone sand	27*
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Dodge silt loam	39*	<u>Typic Udipsamment</u>	
Dodge silt loam	41*	Mixed, mesic	
Fayette silt loam 12/	49*	Plainfield loamy fine sand	159*
Fayette silt loam 12/	51*	Plainfield loamy fine sand	161*
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McHenry taxadjunct 18/	91*	Mixed, frigid	
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St. Charles silt loam 29/	29*	Menahga loamy sand 19/	119*
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Seaton silt loam 12/	207*	Nymore loamy sand 21/	59*
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		Omega	101
Fine, mixed, mesic		HISTOSOL	
Kewaunee silt loam	63*	<u>HEMIST</u>	
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Kewaunee silt loam	69*	Dysic	
Ozaukee silt loam	145*	Greenwood taxadjunct	61
Ozaukee silt loam	147*		
Fine, illitic, mesic			
Morley silt loam	113*		
Morley silt loam	115*		
Very-fine, mixed, mesic			
Oshkosh silt loam	131*		
Oshkosh silt loam	133*		

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SAPRIST

BOROSAPRIST

Typic BorosapristDysic

Greenwood taxadjunct 59

Euic

Lupton 83

Lupton 85

Seelyville 119

Terric BorosapristLoamy, mixed, dysic

Beseman 29

Loamy, mixed, euic

Dawson taxadjunct 41

Sandy or sandy-skeletal,mixed, euic

Markey 93

Tawas 127

Ferrihumic, euic

Markey variant 95

MEDISAPRIST

Typic MedisapristEuic, mesic

Houghton 71

Houghton 73

Terric MedisapristLoamy, mixed, euic, mesic

Palms 109

Sandy or sandy-skeletal,mixed, euic, mesic

Adrian 3

INCEPTISOL

AQUEPT

HAPLAQUEPT

Aeric HaplaqueptCoarse-loamy, mixed, nonacid, frigid

Sherry taxadjunct 123

Very-fine, mixed, nonacid, frigid

Bergland 25

Bergland 27

Fine-silty, mixed, nonacid,frigid

Barronett taxadjunct 8/ 3*

Fine-silty, over clayey, mixed,frigid

Sherry variant 121

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OCHREPT

DYSTROCHREPT

Typic DystrochreptCoarse-loamy, mixed, frigid

Sarona taxadjunct 115

Sarona taxadjunct 117

EUTROCHREPT

Dystic EutrochreptCoarse-loamy, mixed, frigid

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FRAGIOCHREPT

Typic FragiochreptCoarse-loamy, mixed, frigid

Ahmeek 5

MOLLISOL

AQUOLLTypic HaplaquollCoarse-loamy, mixed, frigid

Adolph silty clay loam 5*

Fine-silty, mixed, frigid

Adolph variant 2/ 7*

Fine-silty, mixed, mesic

Ossian silty clay loam 22/ 43*

Pella silty clay loam 24/ 45*

Fine, mixed, mesic

Ashkum silt loam 17*

Ashkum silt loam 19*

Poygan silty clay loam 183*

Very-fine, mixed, mesic

Poygan taxadjunct 28/ 185*

Clayey over sandy or sandy-skeletal,mixed, mesic

Poy silty clay loam 181*

BOROLL

ARGIBOROLL

Typic ArgiborollCoarse-loamy, mixed

Chetek taxadjunct 35

Aquic ArgiborollFine-loamy, mixed

Alstad taxadjunct 9

MOLLISOL--Continued

MOLLISOL--Continued

UDOLL--Continued

ARGUIDOLL

Typic Arguidoll

Fine-loamy, mixed, mesic

Hochheim	67
Hochheim	69
Markesan silt loam <u>13/</u>	83*
Ringwood silt loam	193*
Ringwood silt loam	195*

Fine-silty, mixed, mesic

Mendota silt loam <u>20/</u>	85*
Plano silt loam <u>25/</u>	71*
Plano silt loam <u>25/</u>	73*
Plano silt loam	169*
Plano silt loam	171*

Fine, mixed, mesic

Pebbles silty clay loam	155*
Pebbles silty clay loam	157*

Fine, illitic, mesic

Varna silt loam	219*
Varna silt loam	221*

HAPLUDOLL

Typic Hapludoll

Fine-silty, mixed, mesic

Port Byron silt loam	173*
Port Byron silt loam	175*
Port Byron silt loam <u>26/</u>	177*
Port Byron silt loam	179*
Port Byron, bench phase <u>27/</u>	189*
Port Byron, bench phase <u>27/</u>	191*

Entic Hapludoll

Sandy, mixed, mesic

Sparta loamy sand	213*
Sparta loamy sand	215*

SPODOSOL

ORTHOD

FRAGIORTHOD

Typic Fragiorthod

Sandy, mixed, frigid

Kalkaska variant	77
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Coarse-loamy, mixed, frigid

Gogebic taxadjunct	55
--------------------	----

Alfic Fragiorthod

Coarse-loamy, mixed, frigid

Gogebic taxadjunct	57
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HAPLORTHOD

Typic Haplorthod

Sandy, mixed, frigid

Kalkaska	79
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ORTHOD--Continued

HAPLORTHOD--Continued

Alfic Haplorthod

Coarse-loamy, mixed, frigid

Emmet fine sandy loam <u>10/</u>	47*
Emmet loam <u>11/</u>	125*
Lafont silt loam <u>10/</u>	75*
Lafont silt loam <u>10/</u>	77*

Fine-loamy, mixed, frigid

Onaway loam <u>10/</u>	127*
Onaway loam <u>10/</u>	129*

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Fine-silty, mixed, frigid		Fine-loamy, mixed	15
Auburndale	21	Arland 6/	
Auburndale	23		
Aeric Glossaqualf		UDALF	
Fine-loamy, mixed, frigid		HAPLUDALF	
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Almena	11		
Almena	13	Fine-loamy, mixed, mesic	
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Fine-loamy, mixed, frigid		Norden	117
Marshfield 15/	37	Coarse-silty, mixed, mesic	
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<hr/>			
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<hr/>			
<hr/>			
Fine-silty, mixed, frigid		Fine-silty, mixed, mesic	
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		Fayette 12/	55
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Otterholt	135	Kewaunee	65
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Otterholt	139	Kewaunee	69
Otterholt	141	Ozaukee	145
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Amery 4/	111	Oshkosh	131
Amery 5/	197	Oshkosh	133
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Santiago	199	Fine, mixed, mesic	
Santiago	201	Manawa	79
Fine-loamy over sandy or		Manawa	81
sandy-skeletal, mixed		Mollic Hapludalf	
Onamia	123	Coarse-loamy, mixed, mesic	
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<u>Ultic Hapludalf</u>			<u>Very-fine, mixed, mesic</u>		
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Port Byron silt loam	S56WI-32-1	Hapludoll	173*
Port Byron silt loam	S57WI-32-1	Hapludoll	175*
Port Byron silt loam	S57WI-32-2 <u>26/</u>	Hapludoll	177*
Port Byron silt loam	S57WI-32-3	Hapludoll	179*
Port Byron, bench phase	S56WI-32-3 <u>27/</u>	Hapludoll	189*
Port Byron, bench phase	S56WI-32-4 <u>27/</u>	Hapludoll	191*
Poy silty clay loam	S57WI-70-1	Haplaquoll	181*
Poygan silty clay loam	S57WI-8-1	Haplaquoll	183*
Poygan taxadjunct	S57WI-70-3 <u>28/</u>	Haplaquoll	185*
Richford loamy sand	S57WI-69-3	Hapludalf	187*
Rietbrock taxadjunct	S70WI-37-5	Eutroboralf	111
Ringwood silt loam	S62WI-11-3	Argiudoll	193*
Ringwood silt loam	S62WI-11-6	Argiudoll	195*
Rosholt taxadjunct	S75WI-95-6	Eutroboralf	113
St. Charles silt loam	S52WI-14-20 <u>29/</u>	Hapludalf	29*
St. Charles silt loam	S52WI-14-27 <u>29/</u>	Hapludalf	31*
Santiago silt loam	S60WI-55-2	Glossoboralf	199*
Santiago silt loam	S60WI-55-3	Glossoboralf	201*
Sarona taxadjunct	S69WI-65-1	Dystrochrept	115
Sarona taxadjunct	S69WI-65-2	Dystrochrept	117
Seaton taxadjunct	S56WI-32-5 <u>30/</u>	Hapludalf	203*
Seaton taxadjunct	S56WI-32-6 <u>30/</u>	Hapludalf	205*
Seaton silt loam	10 <u>11/</u>	Hapludalf	207*
Seaton taxadjunct	S60WI-47-4 <u>31/</u>	Hapludalf	209*
Seaton silt loam	S60WI-47-5	Hapludalf	211*
Seelyeville	S74WI-83-3	Borosaprist	119
Sherry variant	S70WI-71-1	Haplaquept	121
Sherry taxadjunct	S70WI-71-4	Haplaquept	123
Sparta loamy sand	S57WI-32-4	Hapludoll	213*
Sparta loamy sand	S57WI-32-5	Hapludoll	215*
Spencer silt loam	S47WI-3-28	Glossoboralf	217*
Stambaugh taxadjunct	S72WI-21-7	Glossoboralf	125
Tawas	S74WI-75-1	Borosaprist	127
Theresa	S68WI-8-3	Hapludalf	129
Theresa	S68WI-8-4	Hapludalf	131
Varna silt loam	S58WI-51-1	Argiudoll	219*
Varna silt loam	S58WI-51-2	Argiudoll	221*
Waymor taxadjunct	S68WI-36-1	Hapludalf	133
Waymor taxadjunct	S68WI-36-2	Hapludalf	135

SOIL SERIES INDEX

- 1/ County numbers (the number following "WI" in the Soil Survey No.) are as follows:
Projects sampled before 1974

1. Adams	42. Oconto
2. Ashland	44. Outagamie
3. Barron	45. Ozaukee
4. Bayfield	47. Pierce
8. Calumet	48. Polk
11. Columbia	49. Portage
13. Dane	51. Racine
14. Dodge	52. Richland
16. Douglas	54. Rusk
20. Fond du Lac	55. St. Croix
21. Forest	60. Taylor
24. Green Lake	61. Trempealeau
26. Iron	63. Vilas
27. Jackson	65. Washburn
30. Kenosha	66. Washington
32. La Crosse	69. Waushara
36. Manitowoc	70. Winnebago
37. Marathon	71. Wood

Projects sampled during 1974

25. Dane	83. Oconto
55. Jefferson	85. Oneida
67. Langlade	95. Polk
75. Marinette	

(The following footnotes were designed to be copied and posted on appropriate pages of SSIR No. 17.)

- 2/ This pedon is a variant of Adolph because the sand content is lower and the clay content higher than normal; this pedon is fine-silty rather than coarse-loamy.
- 3/ This pedon is classified in a fine-silty family because 17.5 percent clay rounds to 18 percent.
- 4/ This pedon was sampled as Milaca silt loam; however it is in a coarse-loamy family and belongs in the Amery series.
- 5/ This pedon was sampled as Santiago silt loam; however it is in a coarse-loamy family and belongs in the Amery series.
- 6/ This pedon is classified in a fine-loamy family because the clay content in the upper portion of the control section rounds to 18 percent.
- 7/ No tonguing was described when this pedon was sampled. Tonguing was not commonly described in 1961; therefore, it is assumed that tonguing was present and the pedon is classified as a Glossaqualf.
- 8/ This pedon was sampled as Adolph silt loam; however it is in a fine-silty family; it has been correlated as a taxadjunct to the Barronett series.
- 9/ This pedon was sampled Meridian fine sandy loam; however, it is in a coarse-loamy family and lacks high base saturation with depth. This pedon is a taxadjunct to the Billett series.
- 10/ Pedon placement based on series classification because chemical data are incomplete.
- 11/ This pedon was sampled as Onaway loam; however, it is in a coarse-loamy family and belongs in the Emmet series; pedon placement based on series classification because chemical data are incomplete.
- 12/ Pedon sampled as part of Project Z-1-2-8.
- 13/ This pedon of Markesan silt loam has a thinner solum and less pronounced subsoil clay accumulation than is common for the series.
- 14/ This pedon, sampled as Cassel silt loam, has been correlated with Marshfield; it is a taxadjunct because the chroma in the A21 horizon is too high for the typic subgroup.
- 15/ This pedon, sampled as Cassel silt loam, has been correlated with Marshfield silt loam.
- 16/ This pedon is in a fine-silty family; it is a taxadjunct to the Marshfield series.
- 17/ This pedon has the B horizon clay accumulation at greater depth than is common for the Marshfield series.
- 18/ This pedon is in a fine-silty family; it is a taxadjunct to the McHenry series.

SOIL SERIES INDEX--continued

19/ This pedon, sampled as Omega loamy sand, has been correlated with Menahga loamy sand because of parent material color and coarseness of sand.

20/ This pedon, sampled as Markesan silt loam, has been correlated with Mendota silt loam.

21/ This pedon, sampled as Kellner loamy sand, has been correlated with Nymore loamy sand.

22/ This pedon, sampled as Elba silt loam, has been correlated with Oahe silt loam.

23/ This pedon does not have the base saturation required for a typic subgroup; it is a taxadjunct to the Palsgrove series.

24/ This pedon, sampled as Elba silt loam, has been correlated with Pella silty clay loam.

25/ This pedon, sampled as Keyser silt loam, has been correlated with Plano silt loam as a moderately well-drained phase.

26/ This pedon, sampled as Keyser silt loam, has been correlated with Plano silt loam as a moderately well-drained phase.

SOIL CLASSIFICATION-

SERIES - - - - -

SOIL NO- - - - -

GENERAL METHODS- - -

COUNTY - - -

SAMPLE NOS.-

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NRCS
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

DEPTH HORIZON		PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B- - - - - RATIO																		
		FINE (-)										SAND			SILT		FAML INTR FINE		NON- 8D1	
		SAND	SILT	CLAY	CLAY	VCQS	CORS	MEDS	FNES	VFNS	QCSL	FNSL	VFSI	TEXT	II	CLAY	CO3	15-		
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	2-	TO	CLAY	BAR		
GM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY	70			
		PCT LT 2MM - - - - - PCT PCT CLAY																		
		Size class and particle diameter (mm)																		
Depth (in.)	Horizon																			
		Sand		Silt	Clay	Fine clay	Sand			Silt			Family texture sand	Inter-natural II	Ratio fine clay to clay	Non-carbonate clay pct	Ratio 15-bar to clay			
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (<0.002)	Fine clay (<0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	(0.05-0.02)	Int. III (0.02-0.002)	(0.005-0.002)	(2-0.1)	(0.02-0.002)					
		Pct of < 2mm																		
COLUMN		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2(BULK DENSITY				- - - - - WATER CONTENT - - - - -				CARBONATE				(- -PH - -)	
	VOL. (- - - - -)					WEIGHT (- - - - -)					4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E			
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	NRD	LT	LT	1/1	1/2						
2	75																							
GM	PCT	PCT	PCT	PCT	PCT	LT 75	LT20	G/C	G/C		PCT	PCT	PCT	CM				2	.002	H2O	CACL			
																		PCT	PCT					

Depth (in.)	Size class and particle diameter (mm)						Bulk density				Water content				Carbonate as CaCO3		pH	
	vol- ume > 2	Weight					1/3- bar	Oven- dry	COLE	1/10- bar	1/3- bar	15- bar	1/3-to 15-bar cm/cm (in./in.)	< 1mm mm	.002 mm	(1:1) H2O	(1:2) CaCl2	
	pct	pct	pct	pct	pct	pct	g/cc	g/cc		pct	pct	pct	cm/cm (in./in.)	pct	pct			

COLUMN	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
--------	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----

DEPTH (ORGANIC MATTER) IRON PHOS (- - - EXTRACTABLE BASES 5B4A- -) ACTY AL (CAT EXCH) RATIO RATIO CA (BASE SAT)																	
	6A1A	6B1A	C/N	6C2A	6S1A	6N2E	6O2D	6P2A	6Q2A	6H1A	6G1D	5A3A	5A6A	8D1	8D3	5F	5C3
	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	EXTB	NHAC	NHAC	CA	SAF	EXTB
	CAH8			FE						EXTB	TEA	EXT	ACTY	TO	TO	NHAC	ACTY
GM	PCT	PCT		PCT	PCT	(- - - - -)	-MEQ / 100	G - - - - -	(- - - - -)	CLAY	MG	PCT	PCT	PCT			

Depth (in.)	Organic matter				Ext. iron as Fe	Total phosphorus	Extractable bases 5B					Ext. acidity	KCl ext. Al	Cat.exch.cap.		Ratio NH ₄ OAc to clay	Ratio Ca to Mg	Ca saturation NH ₄ OAc	Base saturation	
	Organic carbon	Nitro- gen	C/N	Ca			Mg	Na	K	Sum extract- able bases	Sum of bases plus acidity			NH ₄ OAc	Extract- able acidity				NH ₄ OAc	
	pct	pct		pct	pct	meq/100g											pct	pct	pct	

DEPTH	(SATURATED PASTE)																	NA	NA	SALT	GYP	(- - - - - SATURATION EXTRACT 8A1- - - - -)																	ATTERBERG	
	8E1	8C1B	8A	SD2	SE	8D5	6F1A	8A1A	8N1B	6D1B	6P1A	6Q1A	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2																					
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LIQD	PLST																					
	OMM-					SOLU		MMHOS/										LMIT	INDX																					
GM	CM		PCT	PCT		PPM	PCT	CM	(- - - - - MEQ / LITER - - - - -)																	PCT														
Depth (in.)	Saturated paste			Exch. Na	Sodium adsorp- tion ratio	Total soluble salt	Gypsum	Elec- trical conduc- tivity mmhos/ cm	Saturation extract									Atterberg																						
	Resis- tivity	pH	Water at sat.						Ca	Mg	Na	K	CO ₃	HCO ₃	Cl	SO ₄	NO ₃	Liquid limit	Plasti index																					
ohm-cm		pct	pct	ppm	pct	cm	meq/liter									pct																								
COLUMN	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76																					

Remarks: EXAMPLE DATA SHEET HEADINGS--This page alternates computer data sheet headings with printed data sheet headings and column numbers. Column numbers refer to more complete column headings on an adjoining page.

COLUMN HEADINGS FOR COMPUTER PRINTED DATA SHEETS

Column

1	Depth in centimeters
2	Horizon
3	Columns 3 through 16 display numbers which are percents of the total weight of particles 2 millimeters or less in size.
4	Total sand (particles range from .05 to 2 millimeters)
5	Total silt (particles range from .002 to .05 millimeter)
6	Total clay (particles are smaller than .002 millimeter)
7	Total fine clay (particles are smaller than .0002 millimeter)
8	Very coarse sand (particles range from 1 to 2 millimeters)
9	Coarse sand (particles range from 0.5 to 1 millimeter)
10	Medium sand (particles range from 0.25 to 0.5 millimeter)
11	Fine sand (particles range from 0.1 to 0.25 millimeter)
12	Very fine sand (particles range from .05 to 0.1 millimeter)
13	Coarse silt (particles range from .02 to .05 millimeter)
14	Fine silt (particles range from .002 to .02 millimeter; these limits also define the range of total silt on the International Soil Science Society Scale.)
15	Very fine silt (particles range from .002 to .005 millimeter)
16	Family texture sand (particles range from 0.1 to 2 millimeters)
17	International II (particles range from .02 to 0.2 millimeter; these limits define the range of the fine sand on the International Soil Science Society Scale.)
18	Fine clay to clay (this is the ratio of fine clay to total clay expressed as percent.)
19	Noncarbonate clay (this is the percentage of total clay, column 5, minus the percentage of carbonate clay, column 36.)
20	Ratio of 15-bar water percentage to total clay percentage
21	Volume of material greater than 2 millimeters given as a percent of total (sample volume)
22	Greater than 75 millimeter material given as a percent of total sample weight
23	Particle size range from 20 to 75 millimeters given as a weight percent of all material 75 millimeters or less in the sample
24	Particle size range from 5 to 20 millimeters given as a weight percent of all material 75 millimeters or less in the sample
25	Particle size range from 2 to 5 millimeters given as a weight percent of all material 75 millimeters or less in the sample
26	Particle size range less than 0.74 millimeter given as a weight percent of all material 75 millimeters or less
27	Particle size range from 2 to 20 millimeters given as a weight percent of all material 20 millimeters or less
28	Bulk density of soil desorbed to 1/3-bar given in grams per cubic centimeter
29	Bulk density of oven dry soil given in grams per cubic centimeter
30	Coefficient of linear extensibility
31	Water content of soil desorbed to 1/10-bar given as a percent of oven dry weight
32	Water content of soil desorbed to 1/3-bar given as a percent of oven dry weight
33	Water content of soil fragments desorbed to 15 bars given as a percent of oven dry weight
34	Water retention difference given in centimeter per centimeter
35	Column used for any water content measurement different from those given in columns 30 through 33
36	Carbonate content of the material 2 millimeters or less given as a percent
37	Carbonate content of the material .002 millimeter or less given as a percent
38	pH of a 1:1 suspension of soil in distilled water
39	pH of a 1:2 suspension of soil in .01 M CaCl ₂
40	Organic carbon given as a percent

41	Organic carbon to nitrogen ratio
42	Extractable iron given as a percent
43	Total phosphorus given as a percent
44	Extractable calcium given in milliequivalents per 100 grams of soil
45	Extractable magnesium given in milliequivalents per 100 grams of soil
46	Extractable sodium given in milliequivalents per 100 grams of soil
47	Extractable potassium given in milliequivalents per 100 grams of soil
48	Sum of the extractable bases given in milliequivalents per 100 grams of soil
49	Acidity - barium chloride with triethanolamine measurement - given in milliequivalents per 100 grams of soil
50	Aluminum - potassium chloride extraction - given in milliequivalents per 100 grams of soil
51	Cation exchange capacity by sum of the extractable bases plus the acidity given in milliequivalents per 100 grams of soil
52	Cation exchange capacity as measured by ammonium acetate given in milliequivalents per 100 grams of soil
53	Ratio of ammonium acetate cation exchange capacity to total clay
54	Ratio of extractable calcium to extractable magnesium
55	Calcium saturation of the ammonium acetate cation exchange capacity given as a percent
56	Base saturation - sum of the extractable bases divided by the acidity plus the sum of the extractable bases - given as a percent

Continued

COLUMN HEADINGS FOR COMPUTER PRINTED DATA SHEETS

Column

57	Base saturation - sum of the extractable bases divided by the ammonium acetate cation exchange capacity - given as a percent
58	Saturated paste (soil plus water) resistivity given in ohm-cm
59	Saturated paste (soil plus water) pH
60	Saturated paste (soil plus water) water content given as a percent
61	Exchangeable sodium percentage
62	Sodium adsorption ratio
63	Total soluble salt given in parts per million
64	Gypsum given in percent
65	Electrical conductivity of the saturation extract given in mmhos per centimeter
66	Calcium content of the saturation extract given in milliequivalents per liter
67	Magnesium content of the saturation extract given in milliequivalents per liter
68	Sodium content of the saturation extract given in milliequivalents per liter
69	Potassium content of the saturation extract given in milliequivalents per liter
70	Carbonate (CO_3) content of the saturation extract given in milliequivalents per liter
71	Bicarbonate (HCO_3) content of the saturation extract given in milliequivalents per liter

SOIL CLASSIFICATION-TERRIC MEDISAPRIST
SANDY OR SANDY-SKELETAL, MIXED, EUIC, MESIC
SERIES - - - - -ADRIAN

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MYSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - 574W1-55-1 COUNTY - - - JEFFERSON

GENERAL METHODS- - 1A,1B1B,2A1,2B

SAMPLE NOS. 74L1474-74L1478

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO		
		FINE (SAND - SILT - CLAY)															INTR	FINE	NON-
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	II	CLAY	CO3-	8D1	
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY	BAR	
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	PCT	PCT	
		PCT LT 2MM															PCT	PCT	CLAY
000-25	CAP																		
025-34	OA2																		
034-66	CA3																		
066-95	CA4																		
095-150	2C	91.3	7.5	1.2		7.6	25.2	19.9	26.4	12.2	4.6	2.9		79.1				.92	

DEPTH	PARTICLE SIZE ANALYSIS, MM, 30, 301, 302										BULK DENSITY				WATER CONTENT				CARBONATE			
	VOL. (WEIGHT)										4A1D	4A1H	4D1	4B1C	4B1C	4B2A	4C1	6E1B	3A1A	8C1A	8C1E	
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD			LT	LT	1/1	1/2		
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/			2	.002	H2O	CACL		
CM	PCT	PCT	PCT	PCT	LT 75	LT20	G/CC	G/CC			PCT	PCT	PCT	CM			PCT	PCT				
000-25	TR	0	0	TR	TR	TR								95					4.8	4.5		
025-34	TR	0	0	TR	TR	TR	.27	.72			305	247	103	.39					5.0	4.7		
034-66	TR	0	0	TR	TR	TR	.26	.70			328	260	102	.41					5.7	5.2		
066-95	TR	0	0	TR	TR	TR	.28	1.15			303	259	121	.39					6.1	5.5		
095-150	10	0	0	10	5	12	15							1.1					7.3	6.5		

CM	6A1A ORGN CARB PCT	6B1A NITS PCT	C/N	6C2B EXT FE PCT	TOTL PCT	6N2E CA	6O2D MG	6P2B NA	6Q2B K	SUM EXTB G- / 100	6H1A BACL TEA G-	6G1E KCL EXT	6A3A EXTB ACTY	6A6A NHAC ACTY	8D1 NHAC TO CLAY	8D3 CA MG	5F1 SAT NHAC PCT	5C3 EXTB ACTY PCT	5C1 NHAC PCT
000-25	41.8	3.33	13			81.7	13.0	.1	1.6	98	102		198	139		6.3	59	49	69
025-34	43.2	3.27	13			103	18.4	.2	1.7	123	97.9		221	156		5.6	66	56	79
034-66	36.0	2.94	12			100	28.6	.1	1.7	130	74.3		205	141		3.5	71	64	92
066-95	29.0	2.78	10			131	46.9	.3	1.1	179	67.1		246	172		2.8	76	73	104
095-150	.18	.008	22																

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	SATURATION EXTRACT										8A1-) ATTERBERG			
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2					
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST					
CM	CM		PCT	PCT		SOLU	PCT	MMHQS/										CM	CM					
						PPM		CM (					MEQ / LITER					CM	CM
000-25	830	4.2	403			6900		2.50	18.4	6.7	.1	1.5	0	.3	.5	4.2	23.5							
025-34	1100	4.7	588			6000		1.61	10.7	4.3	TR	1.0	0	.0	.2	3.9	12.4							
034-66	740	4.9	457			7400		2.50	14.6	9.4	TR	1.4	0	.3	.5	4.8	21.0							
066-95	1300	5.8	556			4500		1.14	6.6	5.3	.1	.6	0	.3	.7	5.5	5.8							
095-150																								

DEPTH	(STATE OF DECOMPOSITION)										HISTOSOL CHARACTERIZATION										WATER CONTENT	
	8F	8G	8H	8C1E	4A3A	4A1I	4D1	4B4	4B1C	4B2	4C1	PH	(BULK DEN)	COLE	SUBS	(-)	WATER	CONTENT				
	MINL	(FIBER VOL)	PYROPHOSPT	.01M	FILO	1/30	RE-	RES-	FILD	1/30	15-	WRD										
CM	CON	UMRB	RUB	SOLUBILITY	CACL	STAT	REMT	WET	IOUE	STAT	REMT	BAR	CM/									
CM	PCT	PCT	PCT	(MUNS COLOR)		G/CC	G/CC															
000-25	20	35	5	7.5YR	4/2	4.2	.24					71	211									
025-34	16	63	5	7.5YR	4/3	.21	.36	.26				98	273	191								.35
034-66	30	12	1	10 YR	2/2	5.5	.25	.36	.21			97	246	182								1.25

Soil classification: Terric Medisaprists; sandy or sandy-skeletal, mixed, eutic, mesic.

Series: Adrian.

Soil No.: S74WI-55-1.

Location: Jefferson County, Wisconsin; SE $\frac{1}{4}$, NW $\frac{1}{4}$, sec. 20, T. 6 N., R. 15 E.; 210 feet south from culvert where field lane crosses drainage ditch and 102 feet west from field lane (along drainage ditch).
About 43° 6' N latitude and 88° 37' W longitude.

Climate: Humid continental. Mean annual temperature is 47.4° F; mean July temperature is 72.3° F; mean January temperature is 19.8° F; mean annual precipitation is 29.76 inches with nearly two-thirds of the precipitation falling during the growing season; total amount of snow is 32.1 inches; the growing season averages 154 days, but less in organic areas (data from Fort Atkinson, WI, weather bureau substation).

Parent material: Deposits of herbaceous organic material 16 to 50 inches thick over sand.

Physiography: Old glacial lake basin.

Vegetation: Corn.

Size of area: About 1,200 acres.

Distance to adjacent mineral soil: About 230 feet to the north.

Depth to water table: 142 cm.

Microrelief: Slight or none.

Subsidence: Estimated to be moderate.

Described and sampled by: G.W. Hudelson and C.L. Glocker. Sampled from pit to 40 inches. Bucket auger used to sample sand.

Oap 74L1474 0 to 25 cm. Black (10YR 2/1) broken face, rubbed, and pressed sapric material; about 20 percent or less fibers; less than 5 percent rubbed; weak fine granular structure; very friable; fibers primarily herbaceous; about 10 percent mineral soil material; many roots; pH 6.0 (LaMotte); abrupt smooth boundary.

Oa2 74L1475 25 to 34 cm. Black (10YR 2/1) broken face, rubbed, and pressed sapric material; about 20 percent fibers; less than 5 percent rubbed; weak medium subangular blocky structure; very friable; fibers primarily herbaceous; about 10 percent mineral soil material; many roots; pH 6.0 (LaMotte); abrupt wavy boundary.

Oa3 74L1476 34 to 66 cm. Black (N 2/0) broken face, rubbed, and pressed sapric material; about 40-50 percent fibers; less than 5 percent rubbed; weak coarse subangular blocky structure; friable; fibers primarily herbaceous; about 10 percent mineral soil material; few roots; pH 6.4 (LaMotte); abrupt wavy boundary.

Oa4 74L1477 66 to 95 cm. Black (N 2/0) broken face, rubbed, and pressed sapric material; about 40 to 50 percent fibers, less than 5 percent rubbed; weak coarse prismatic parting to weak medium subangular blocky structure; friable; fibers primarily herbaceous; about 10 percent mineral soil material; few roots; pH 6.6 (LaMotte); gradual wavy boundary.

IIC 74L1478 95 to 150 cm. Grayish brown (10YR 5/2) medium sand; single grained; loose; about 15 percent gravel by volume; pH 7.6 (LaMotte); strong effervescence.

Remarks:

1. The 10 cm boundary between mineral and organic horizons contains alternate layers of organic material (sapric) and medium sand. Layers are about 1 cm thick.
2. Boundaries between Oa2 and Oa3 and Oa4 are shear planes. Material immediately above is slightly more fibrous and more matted than remainder of horizon.
3. IIC horizon contains about 15 percent gravel by volume.

Ahmeek

Iron Co., Wisconsin

S49WI-26-1

Beltsville Soil Survey Lab. Nos. 49990-49996

Depth cm	Horizon	M.E./100 Grams Soil						% B. SAT	pH	% O.C.	Size Classes %							
		Ca	Mg	K	Na	H ¹	S ²				Clay	III ³	USDA Silt	VPS	FS	MS	CS	VCS
0- 6	A1	3.8	0.8	0.3	0.4	14.3	19.6	27	4.1	3.86	8.7	26.8	63.3	10.4	9.4	4.3	2.8	1.1
6- 17	B21	1.9	0.7	0.2	0.1	22.7	25.6	11	4.5	2.76	9.9	23.9	61.2	11.0	8.4	4.1	3.4	2.0
17- 47	B22	0.6	0.2	0.1	<0.1	16.0	16.9	5	5.0	1.61	4.8	23.8	65.4	11.4	8.9	4.6	3.5	1.4
47- 60	B23x	0.2	<0.1	0.2	<0.1	11.8	12.2	3	5.2	0.92	5.4	12.7	35.4	15.1	21.0	11.0	8.3	3.8
60- 75	B24x	0.2	0.1	0.2	<0.1	6.5	7.0	7	5.4	0.42	3.0	10.1	28.1	16.2	25.6	13.1	9.6	4.4
75-105	B3x	0.5	0.1	0.1	<0.1	3.2	3.9	18	5.6	0.15	2.5	22.3	29.3	15.1	24.9	12.4	10.0	5.8
105-120	C1	1.0	0.5	0.2	<0.1	2.2	3.9	44	5.6	0.11	3.7	11.8	29.3	14.8	24.3	12.7	9.8	5.4

1 Acidity

2 CEC by sum of cations

3 International III - This is PSDA fine silt (.02-.002 mm).

Soil classification: Typic Fragiochrept; coarse-loamy, mixed, frigid.

Soil: Ahmeek.

Soil No.: S49WI-26-1.

Location: Iron County, Wisconsin; SE $\frac{1}{4}$, Sec. 6, T. 45 N., R. 1 E.; 60 feet east of State Highway 122, about 2-1/2 miles north of Upson, Wisconsin.

Climate: Continental; air temperature is about 37° to 43° F; average annual precipitation is 25 to 30 inches; frost-free season is 90 to 105 days.

Vegetation and land use: Most of this soil is forested with a cover of trembling aspen, paper birch, maple, balsam fir, and white pine. A small portion is cropped to small grains and hay or is in pasture.

Parent material: Reddish brown sandy loam or fine sandy loam till of the Superior lobe that is late Wisconsin age. In places a thin loess mantle occurs which rarely exceeds 30 cm.

Physiography: Sloping to hilly upland.

Topography: Near crest of hill. Gradient is 8 percent.

Drainage: Well and moderately well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderately slow.

Described by: J.K. Ableiter, I.J. Nyard, R.J. Muckenhirn, and V.T. Kilmer.

(Colors are for moist conditions unless otherwise stated)

A1 49990 0 to 6 cm (0 to 2.5 inches). Dark reddish gray and dark reddish brown (5YR 4/2 and 3/2) silt loam, pinkish gray (5YR 6/2) dry; moderate coarse to fine granular structure; friable; few pebbles in several spots of concentrated gray (A2) occur in this layer; few earthworms; strongly acid.

B21 49991 6 to 17 cm (2.5 to 7 inches). Reddish brown (5YR 4/4) silt loam, yellowish red (5YR 4/6), light reddish brown (5YR 6/4) dry; moderate coarse granular structure parting to weak fine granules; friable; gray spots and patches occasionally found at top of this horizon; common roots; common pebbles; few earthworms; strongly acid.

B22 49992 17 to 47 cm (7 to 19 inches). Reddish brown (5YR 4/4) silt loam, light brown (7.5YR 6/4) dry; moderate coarse subangular blocky structure parting to weak fine granules; firm; few stones 8 to 12 inches in diameter and many pebbles; medium acid.

B23x 49993 47 to 60 cm (19 to 24 inches). Reddish brown (2.5YR 4/4) loam, reddish brown (5YR 5/3) dry; slight to moderately cemented and hardened in place, breaking to irregular fragments; very firm; pebbles and cobblestones of red sandstone and dark basalt rocks, mostly rounded, a few angular; few roots; medium acid.

B24x 49994 60 to 75 cm (24 to 30 inches). Reddish brown (5YR 4/4) gravelly loam, light reddish brown (5YR 6/4) dry; moderately cemented and hardened in place, breaking out into moderate resistant irregular angular blocks; very firm; pebbles and cobblestones made up 10 to 20 percent of volume; they are rounded and consist of dark colored rocks and red sandstone; dark rocks include basalt, gneiss and dense hard red rocks; medium acid.

B3x 49995 75 to 105 cm (30 to 42 inches). Reddish brown (5YR 5/3) sandy loam, light reddish brown to pink (5YR 6/3 to 7/3) dry; moderately cemented; hard in place; breaks to irregular fragments which crush with moderate to strong resistance when moist; very firm; contains up to 20 percent pebbles and cobblestones with the same lithology as horizon above; medium acid.

C1 49996 105 to 120 cm (42 to 48 inches). Reddish brown (2.5YR 4/4) loam, light reddish brown to pink (5YR 6/3 to 7/3) dry; massive; friable; contains about 25 percent pebbles, mostly 1 to 3 inches in diameter; medium acid.

SOIL CLASSIFICATION-GLASSIC EUTROBORALF
COARSE-LOAMY, MIXED
SERIES - - - - -ALBAN TAXADUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S75WI-95-7 COUNTY - - - POLK

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 760218-760224

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -														RATIO		
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	FNES	FNES	FNES	FNES	FNES	INTR	FINE	NON-
		2-	2-	LT	LT	LT	2-	1-	2-	2-	2-	2-	2-	2-	2-	11	CLAY	CO3-
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	70	CLAY	TO
CM		PCT LT 2MM - - - - -														PCT	PCT	CLAY
000-020	AP	72.1	24.3	3.6	1.7	3.3	10.3	21.2	20.4	16.9	13.1	11.2		55.2	38.0	47		1.33
020-051	A2	77.3	19.7	3.0	1.4	5.9	12.6	20.5	23.2	15.1	11.6	8.1		62.2	35.4	47		.60
051-081	A&B	68.9	21.3	9.8	5.6	1.7	3.2	10.3	13.6	40.1	16.5	4.8		28.8	63.8	57		.45
081-112	B&A	57.6	29.4	13.0	7.5	TR	.8	3.2	7.0	46.6	23.2	6.2		11.0	74.5	58		.45
112-120	B3	75.5	15.7	8.8	4.6	.2	.9	11.5	22.3	40.6	12.5	3.2		34.9	66.2	52		.45
120-143	C1	56.2	32.5	11.3	6.1	.1	.8	1.6	6.6	47.1	26.1	6.4		9.1	77.8	54		.47
143-154	C2	95.6	2.9	1.5	1.1	.0	.8	38.6	43.7	12.5	2.7	.2		83.1	30.6	73		.67

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B21														BULK DENSITY				WATER CONTENT				CARBONATE			
	VOL. (--- WEIGHT ---)														4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E	
																		1/10	1/3-	15-	WRD	LT	1/1	1/2		
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	BAR	DRY	BAR	BAR	BAR	CM/	2	.002	H2O	CACL						
CM	PCT	PCT	PCT			LT 75	LY20		G/CC	G/CC	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT						
000-020	1	0	0	1	1	40	2	1.59	1.62	.006				16.2	4.8	.18				6.1	5.7					
020-051	6	0	0	2	6	31	8	1.74	1.76	.004				9.1	1.8	.12				6.4	5.6					
051-081	TR	0	0	TR	TR	62	TR	1.62	1.67	.010				13.5	4.4	.15				6.2	5.6					
081-112	0	0	0	0	0	81	0	1.58	1.64	.013				18.6	5.8	.20				5.5	4.9					
112-120	0	0	0	0	0	54	0	1.55A						4.0						5.3	4.7					
120-143	0	0	0	0	0	82	0	1.53	1.60	.015				14.5	5.3	.14				5.1	4.7					
143-154	0	0	0	0	0	12	0	1.52B				4.0C		1.0	.05					5.4	4.7					

DEPTH	ORGANIC MATTER			IRON C/N	PHOS TOTL	EXTRACTABLE BASES 5B4A- -				ACTY 6H1A BACL	AL 6G1E KCL	CAT 5A3A EXTB	EXCH SAGA NHAC	RATIO 8D1 NHAC	RATIO 8D3 TO MG	CA 5F1 NHAC	(BASE SAT) 5C3 EXTB	SAT 5C1 NHAC	
	6A1A	6B1A	C/N			6C2B EXT FE	6N2E CA	6O2D MG	6P2B NA										6Q2B K
	ORGN	NITG																	
	CARB PCT	PCT																	
CM	PCT	PCT		PCT	(-	-	-	-	-	-	-	-	-	-	-	-	-	

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	(- - - - -)				SATURATION EXTRACT				8A1- - - - -)				ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2			
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST			
	OHM- CM					SOLU		MMHOS/ CM											LMIT	INOX		
CM	CM		PCT	PCT		PPM	PCT						MEQ / LITER						PCT			
000-020																						
020-051																						
051-081																						
081-112 08100 5.2 37.3 .14 .6 220 40																						
112-120																						
120-143																						
143-154																						

CLAY MINERALOGY (7A2C).

51-81 KK2 VR2 M12 MT1
81-112 MT3 KK2 VR1 M11
112-120 MT3 KK2 VR1 M11

COMMENTS: CHLORITIC INTERLAYE MATERIAL PRESENT.

RELATIVE AMOUNTS: (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.

MINERAL CODE: MT = MONTMORILLONITE MI = MICA KK = KAOLINITE VR = VERMICULITE.

SAND MINERALOGY (7B1). PLACEMENT: MIXED.

051-81 VFNS - RE77 QZ74 FE2 SP1 TM ZR FD17 MN4 GN1 MS1 EP AU CL EN VR.

081-112 VFNS - RE77 QZ75 FE1 SP1 TM ZR RU FD18 MN2 GS1 MS1 VR1 GN EP AU CL.

112-120 VFNS - RE83 QZ80 FE2 ZR1 TM SP FD14 MN2 MS1 AU EP CL VR 8T.

RELATIVE AMOUNTS: AS PERCENT.

MINERAL CODE: BT = BIOTITE CL = CHLORITE EP = EPIDOTE FD = FELDSPARS GS = GLASS HN = HORNBLENDE MS = MUSCOVITE
QZ = QUARTZ TM = TOURMALINE ZR = ZIRCON RE = RESISTANT MINERALS FE = IRON MINERALS SP = SPHENE
GN = GARNET AU = AUGITE EN = ENSTATITE VR = VERMICULITE RU = RUTILE.

(A) ESTIMATED.

(B) CORE SAMPLE, METHOD 4A3A.

(C) SIEVED SAMPLE, METHOD 4B1A.

(D) LIQUID LIMIT AND PLASTIC INDEX BY USDA-SCS, SOIL MECHANICS LAB, LINCOLN, NE.

Soil classification: Glossic Entroboralf; coarse-loamy, mixed.

Soil: Albantaxadjunct*.

Soil No.: S75WI-95-7.

Location: Polk County, Wisconsin; SE $\frac{1}{4}$, Sec. 35, T. 34 N., R. 15 E; 100 feet east of driveway to the ball park. About 45°24' N latitude and 92°11' W longitude.

Climate: Humid continental; mean annual temperature is 43° F; mean July temperature is 71° F; mean January temperature is 11.8° F; mean annual precipitation is 27.5 inches with about two-thirds of this occurring during the growing season; mean annual snowfall is 41.2 inches; the growing season averages 127 days. (Data from Amery, WI, weather bureau substation).

Vegetation and use: Native vegetation was primarily mixed northern hardwoods with some conifers. Most large areas of this soil have been cleared and are used for general farming. This site was in alfalfa hay meadow when sampled.

Parent material: Loamy slack water deposits.

Physiography: Nearly level to sloping glacial lake basins.

Topography: Nearly level; site sampled was on a 1 percent convex slope.

Drainage: Moderately well and well drained.

Ground water: At 4 feet in July and 5 feet in October.

Erosion: Slight.

Permeability: Moderate.

Described by: A.J. Klingelhoets and G.B. Lee, July 1975.

(Colors are for moist soil unless otherwise stated)

Ap 760218 0 to 20 cm (0 to 8 inches). Very dark grayish brown (10YR 3/2) fine sandy loam; weak medium subangular blocky structure parting to moderate medium granular; very friable; many roots; slightly acid; abrupt smooth boundary.

A2 760219 20 to 51 cm (8 to 20 inches). Brown (10YR 5/3) sandy loam; weak coarse platy structure; very friable; many roots; slightly acid; clear wavy boundary.

A&B 760220 51 to 81 cm (20 to 32 inches). Grayish brown (10YR 5/2) loamy very fine sand (A2); weak coarse platy structure; friable; occupies about 60 percent of the horizon as tongues 20 to 40 mm thick extending into or completely surrounding isolated remnants of dark brown (7.5YR 4/4) very fine sandy loam (B2t); weak medium subangular blocky structure; friable; few patchy thin clay films on some faces of peds (B2t); strong brown (7.5YR 5/6) iron stains occur along edges of A2 tongues; many roots; slightly acid; gradual irregular boundary.

B&A 760221 81 to 112 cm (32 to 44 inches). Dark brown (7.5YR 4/4) very fine sandy loam (B2t); weak medium subangular blocky structure; friable; occupies about 80 percent of the horizon; few thin patchy clay films on faces of peds (B2t); tongues 10 to 30 mm thick of grayish brown (10YR 5/2) fine sandy loam (A2) extend to bottom of horizon; weak coarse platy structure; friable; many roots; slightly acid; clear wavy boundary.

B3 760222 112 to 120 cm (44 to 47 inches). Dark brown (7.5YR 4/4) fine sandy loam; weak coarse platy structure parting to weak medium subangular blocky; very friable; few alfalfa roots; slightly acid; clear wavy boundary.

C1 760223 120 to 143 cm (47 to 56 inches). Brown (7.5YR 5/4) fine sandy loam; weak coarse platy structure; very friable; weakly stratified; few alfalfa roots; slightly acid; clear wavy boundary.

C2 760224 143 to 154 cm (56 to 60 inches). Strong brown (7.5YR 5/6) fine and medium sand; single grained; loose; weakly stratified; few thin (1 to 3 cm) dark brown (7.5YR 4/4) loamy fine sand bands; few alfalfa roots; medium acid.

* This pedon is a taxadjunct because the base saturation is too high for the Alban series.

Additional Notes:

pH's in field determined by Truog Kit

SOIL CLASSIFICATION-AQUIC ARGIBOROLL
FINE-LOAMY, MIXED
SERIES - - - - -ALSTAD TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MISC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S75W1-95-1 COUNTY - - - - - POLK

GENERAL METHODS- - - - -1A, 1B1B, 2A1, 2B

SAMPLE NOS. 760169-760177

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO		
		SAND	SILT	CLAY	FINE	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	INTR	FINE	NON-	BDI
CM		2-	.05-	LT	CLAY	LT	2-	1-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY	BAR
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	PCT	TO
		PCT LT 2MM														PCT	PCT	CLAY
000-028	AP	53.3	38.9	7.8	2.6	3.2	7.7	10.9	17.8	13.7	20.3	18.6		39.6	43.1	33		.77
028-041	A2	57.1	32.7	10.2	3.4	4.2	9.7	12.2	18.7	12.3	16.1	16.6		44.8	37.9	33		.48
041-052	A6B	60.3	21.9	17.8	8.7	4.3	9.7	13.8	20.9	11.6	9.8	12.1		48.7	31.9	49		.51
052-074	B6A	58.7	22.4	18.9	8.8	3.7	10.1	13.8	20.3	10.8	9.7	12.7		47.9	30.7	47		.48
074-096	B6A	56.4	24.1	19.5	9.2	4.2	8.7	12.3	19.9	11.3	11.1	13.0		45.1	32.5	47		.52
096-114	B2T	56.8	23.6	19.6	9.2	4.1	9.1	12.8	19.8	11.0	9.1	14.5		45.8	29.9	47		.52
114-131	B3	53.9	27.2	18.9	9.0	3.7	8.5	12.3	18.6	10.8	13.4	13.8		43.1	33.6	48		.53
131-163	C1	59.8	23.2	17.0	7.2	5.4	10.5	13.3	19.5	11.1	9.6	13.6		48.7	30.6	42		.54
163-178	C2	58.7	27.7	13.6	4.1	4.0	9.4	12.2	21.1	12.0	8.8	18.9		46.7	31.5	30		.50

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2)										BULK DENSITY				WATER CONTENT				CARBONATE (- PH -)			
	VDL, (- - - - - WEIGHT - - - - -)										4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E	
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	2	.002	H2O	CA1	CA2			
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/								
CM	PCT	PCT	(- - - PCT	LT	75 - - -)	LT20	G/CC	G/CC		PCT	PCT	PCT	CM				PCT	PCT				
000-028	TR	C	TR	1	1	54	2	1.60	1.66	.013				19.5	6.0	.22				6.4	5.8	
028-041	3	0	0	2	4	47	6	1.60A						4.9						6.7	5.9	
041-052	5	0	TR	2	5	43	7	1.59	1.74	.029				16.5	9.0	.11				6.4	5.9	
052-074	5	0	TR	2	5	44	7	1.61	1.72	.021				17.2	9.1	.12				6.1	5.9	
074-096	5	0	TR	2	5	46	7	1.60A						10.1						5.8	5.4	
096-114	5	0	TR	2	4	46	6	1.64	1.77	.024				19.0	10.2	.14				5.9	5.3	
114-131	5	0	TR	3	4	48	7	1.61	1.69	.016				17.8	10.0	.12				6.0	5.4	
131-163	5	0	TR	2	7	42	9	1.64	1.69	.010				17.4	9.1	.13				6.6	6.1	
163-178	5	0	TR	3	7	43	10	1.65A						6.8			8			7.7	7.3	

DEPTH	ORGANIC MATTER			IRON 6C2B EXT FE PCT	PHOS TOTL CA MG NA K EXTB SUM MEQ / 100	EXTRACTABLE BASES 5B4A--1				ACTY 6M1A BACL TEA G--	AL 6G1E KCL EXT --	CAT EXCH		RATIO 8D1 NHAC TO CLAY	RATIO 8D3 CA TO MG	CA 5F1 NHAC PCT	(BASE SAT)		
	6A1A	6B1A	C/N			6N2E	6D2D	6P2B	6Q2B			5A3A	5A6A				SAT NHAC CA	EXTB ACTY PCT	5C1 NHAC PCT
	ORGN	NITG																	
	CARB																		
CM	PCT	PCT																	
000-028	1.34	.128	10			7.4	1.8	TR	.2	9.4	3.7		13.1	9.5	1.22	4.1	78	72	99
028-041	.18	.028	6			5.1	1.6	TR	.1	6.8	2.8		9.6	7.0	.69	3.2	73	71	97
041-052	.12	.024	5			9.1	3.9	.1	.3	13.4	3.7		17.1	13.7	.77	2.3	66	78	98
052-074	.12					8.8	4.1	.1	.3	13.3	3.4		16.7	13.7	.72	2.1	64	80	97
074-096	.04					9.1	4.7	.1	.3	14.2	4.2		18.4	15.1	.77	1.9	60	77	94
096-114	.08					9.2	4.9	.1	.3	14.5	3.7		18.2	15.5	.79	1.9	59	80	94
114-131	.08					9.2	4.8	.1	.3	14.4	3.1		17.5	14.9	.79	1.9	62	82	97
131-163	.06						4.7	.1	.2		1.8			14.2	.84				
163-178	.04						3.6	.1	.2					9.6	.71				

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	SATURATION				EXTRACT				ATTERBERG			
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2	
CM	REST	PH	H2O	ESP	SAR	TOTL	EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LMIT	PLST	INDX	
	OHM	CM	PCT	PCT	PPM	PCT	CM	MEQ / LITER	MEQ / LITER	MEQ / LITER	MEQ / LITER	MEQ / LITER	MEQ / LITER	MEQ / LITER	MEQ / LITER	MEQ / LITER	PCT	PCT	PCT	
000-028																				
028-041																				
041-052																				
052-074																				
074-096																				
096-114	3600	5.2	35.4					.17								1.3				
114-131																				
131-163																				
163-178																				

CLAY MINERALOGY (7A2C).

41-52 MT5 KK2 M12 VR1
52-74 MT5 KK2 M12 VR1
96-114 MT5 KK2 M12 VR1

RELATIVE AMOUNTS: (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.

MINERAL CODE: MT = MONTORILLONITE MI = MICA KK = KAOLINITE VR = VERMICULITE.

SAND MINERALOGY (7B1).

PLACEMENT: MIXED

041-52 VFNS - RE81 Q279 FE1 TM1 ZR SP FD18 HN1 TE CL MS GN VR. FNES - RE65 Q262 FE3 FD34 MS1.

074-96

074-96 VFNS - RE75 Q273 FE2 TM FD22 HN1 GN1 MS1 AU. FNES - RE75 Q266 FE9 FD15 HN6 GN2 MS2.

RELATIVE AMOUNTS: AS PERCENT.

MINERAL CODE: CL = CHLORITE FD = FELDSPARS HN = HORNBLende MS = MUSCOVITE QZ = QUARTZ TM = TOURMALINE
ZR = ZIRCON RE = RESISTANT MINERALS GN = GARNET TE = TREMOLITE VR = VERMICULITE AU = AUGITE
FE = IRON MINERALS SP = SPHENE GS = GLASS TP = TOPAZ.

(A) ESTIMATED.

(B) LIQUID LIMIT AND PLASTIC INDEX BY USDA-SCS, SOIL MECHANICS LAB, LINCOLN, NE.

Soil classification: Aquic Argiboroll; fine-loamy, mixed.

Series: Alstad taxadjunct*

Soil No.: S75WI-95-1.

Location: Polk County, Wisconsin; NW $\frac{1}{4}$, Sec. 25, T. 36 N., R. 16 W.; 120 feet east of road and 200 feet south of large drain. About 45°35' N latitude and 92° 40' W longitude.

Climate: Humid continental. Mean annual temperature is 43° F; mean July temperature is 71° F; mean January temperature is 11.8° F; mean annual precipitation is 27.65 inches with about two-thirds of this occurring during the growing season; mean annual snowfall is 41.2 inches; the growing season averages 127 days. (Data from Amery, WI., weather bureau substation.)

Vegetation and use: Native vegetation was mixed stands of northern hardwoods and conifer forests. Much of this land has been cleared and presently is used for general farming. Present crop is clover hay.

Parent material: Loamy glacial till.

Physiography: Nearly level to gently sloping glacial ground moraine.

Topography: Nearly level with sample site on a 1 percent concave slope.

Drainage: Somewhat poorly drained.

Ground water: 28 inches in July; over 5 feet in September when sampled.

Erosion: Slightly eroded.

Permeability: Moderately slow.

Described by: A.J. Klingelhoets and G.B. Lee, July 1975.

(Colors are for moist soil unless otherwise stated)

Ap 760169 0 to 28 cm (0 to 11 inches). Very dark grayish brown (10YR 3/2) loam; moderate fine subangular blocky structure parting to moderate medium granular; friable; many roots; neutral; abrupt wavy boundary.

A2 760170 28 to 41 cm (11 to 16 inches). Brown (10YR 5/3) light loam; many medium distinct and prominent yellowish brown and grayish brown (10YR 5/6 and 5/2) mottles; moderate medium and coarse platy structure; friable; many roots; neutral; gradual wavy boundary.

A&B 760171 41 to 52 cm (16 to 20 inches). Brown (7.5YR 5/2) light loam (A2); weak coarse platy structure; friable; occupies about 60 percent of the horizon as tongues extending into or completely surrounding isolated remnants of dark brown (7.5YR 4/4) loam (B2t); moderate medium subangular blocky structure; firm; few thin patchy clay films on faces of peds (B2t); estimated less than 5 percent by volume coarse fragments greater than 2 mm in diameter and less than 1 percent greater than 3 inches in diameter; many roots; neutral; gradual irregular boundary.

B&A 760172 52 to 74 cm (20 to 29 inches). Dark brown (7.5YR 4/4) clay loam (B2t); many medium distinct and prominent strong brown (7.5YR 5/6 and 5/8), yellowish red (5YR 5/6) and grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; few manganese spots and streaks; tongues up to 40 mm thick of brown (7.5YR 5/2) loam extend to bottom of horizon; weak coarse platy structure; friable; estimated less than 5 percent by volume coarse fragments greater than 2 mm in diameter and less than 1 percent over 3 inches in diameter; many roots; slightly acid; clear wavy boundary.

B&A 760173 74 to 96 cm (29 to 38 inches). Dark brown (7.5YR 4/4) clay loam (B2t); many medium distinct and prominent strong brown (7.5YR 5/6 and 5/8), yellowish red (5YR 5/6), and grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; few manganese spots and streaks; tongues up to 40 mm thick of brown (7.5YR 5/2) loam extend to bottom of horizon; weak coarse platy structure; friable; estimated less than 5 percent by volume coarse fragments greater than 2mm in diameter and less than 1 percent over 3 inches in diameter; many roots; slightly acid; clear wavy boundary. (Separated on depth for analysis only.)

B2t 760174 96 to 114 cm (38 to 45 inches). Dark brown (7.5YR 4/4) light clay loam; many medium prominent and distinct grayish brown (10YR 5/2) and reddish brown and yellowish red (5YR 4/4 and 5/6) mottles; moderate medium subangular blocky structure; firm; thin patchy clay films on faces of peds; a few spots and streaks of manganese; estimated less than 5 percent coarse fragments greater than 2 mm in diameter; many roots; slightly acid; gradual wavy boundary.

B3 760175 114 to 131 cm (45 to 51 inches). Dark brown (7.5YR 4/4) loam; many coarse distinct yellowish red and grayish brown (5YR 5/6 and 10YR 5/2) mottles; few thin patchy clay flows on vertical faces of peds and structural cracks; many fine manganese spots and streaks; estimated less than 5 percent coarse fragments over 2 mm in diameter; few roots; medium acid; gradual wavy boundary.

C1 760176 131 to 163 cm (51 to 64 inches). Brown (7.5YR 5/4) loam; many medium distinct grayish brown and strong brown (10YR 5/2 and 7.5YR 5/6) mottles; weak coarse subangular blocky structure; friable; estimated less than 5 percent by volume of coarse fragments over 2 mm in diameter; mildly alkaline.

* This pedon is a taxadjunct to the Alstad series because it has a thick, dark surface that forms a mollic epipedon.

Additional notes:

1. Soil temperature was 14°C at 20 inches in July.

2. pH's in field determined by Truog Kit

3. Sample of 163-178 cm material which is similar to C1 horizon material was assigned map number 760177

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

GENERAL METHODS- -1A, 1B 1B, 2A1, 2B

SAMPLE NDS. 70L924-70L934

DEPTH	PARTICLE SIZE ANALYSIS, MM, 30, 301, 3021										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	VOL. (--- WEIGHT ---)										4A10	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E			
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN COLE	1/10	1/3-	15-	WRD	LT	1/1	1/2								
CM	PCT	PCT	---	PCT	LT	75	---	L720	G/CC	G/CC	PCT	PCT	PCT	PCT	PCT	CM	PCT	PCT						
000-21	TR	0	0	TR	TR	97	TR	1.36	1.43	.017	30.6	29.5	8.5	.29	4.3B					6.5	6.0			
021-30	TR	0	0	TR	TR	97	TR	1.48	1.59	.025	26.4	24.3	12.2	.18	3.0B					5.1	4.3			
030-43	TR	0	0	TR	TR	98	TR	1.50A					13.6							4.4	3.4			
043-58	TR	0	0	TR	TR	85	TR	1.49	1.74	.054	25.5	23.6	14.2	.14	3.0B					4.5	3.9			
058-72	1	0	0	1	TR	66	1	1.49	2.02	.106	29.8	28.0	15.9	.18						5.2	4.6			
072-96	TR	0	0	TR	TR	81	TR	1.51	1.99	.099			27.1	21.3	.09	2.5B				6.5	5.9			
096-125	TR	0	0	TR	TR	86	TR	1.45	1.95	.106			30.0	23.0	.10	1.7B				7.0	6.3			
125-158	TR	0	0	0	TR	86	TR	1.40	1.94	.118	35.9	33.7	23.1	.15	1.1B					6.9	6.4			
158-191	TR	0	0	0	TR	65	TR	1.50A					13.9							6.7	6.0			
191-234	TR	0	0	0	TR	44	TR	1.50A					9.5							5.9	5.2			
234-279	TR	0	0	TR	TR	60	TR	1.50A					12.7							5.7	5.2			

[illegible]

CM	CARR PCT	PCT	FE PCT	PCT (-	- - - - -	-MEQ	EXTB / 100	TEA G-	EXT	ACTY	TO CLAY	TO MG	NHAC PCT	ACTY PCT	PCT			
000-21	1.89C	.166	11	0.6	13.1	2.2	0.2	0.2	15.7	4.1	19.8	16.4	0.96	6.0	80	79	96	
021-30	0.52	.064	8	1.3	8.6	4.4	0.2	0.4	13.6	6.8	0.9	20.4	18.0	0.71	2.0	48	67	76
030-43	0.32	.047	7	1.3	8.5	5.8	0.3	0.4	15.0	11.9	2.9	26.9	22.0	0.74	1.5	39	56	68
043-58	0.20	.029		1.2	9.2	7.6	0.2	0.5	17.5	9.4	1.9	26.9	22.8	0.77	1.2	40	65	77
058-72	0.11			2.2	10.1	8.1	0.2	0.6	19.0	5.8	0.7	24.8	21.8	0.64	1.2	46	77	87
072-96	0.07			3.5	10.2	13.9	0.4	0.6	24.5	3.7		28.2	24.4	0.51	0.8	42	87	100
096-125	0.07			3.5	14.3	11.7	0.4	0.9	27.3	3.3		30.6	26.5	0.51	1.2	54	89	103
125-158	0.06			3.7	13.2	11.2	0.3	1.0	25.7	2.9		28.8	25.6	0.50	1.2	52	90	100
158-191	0.04			3.4	8.8	7.6	0.3	0.5	17.2	2.1		19.3	16.6	0.63	1.2	53	89	104
191-234	0.03			3.2	6.6	5.9	0.2	0.5	13.2	2.3		15.5	13.7	0.85	1.1	68	89	134
234-279	0.03			1.4	9.4	8.0	0.3	0.5	18.2	3.0		21.2	19.2	1.25	1.2	49	86	98

[illegible]

Soil classification: Aeric Glossaqualf; fine, mixed, frigid.

Soil: Altdorf.

Soil No.: S70WI-71-2.

Location: Wood County, Wisconsin; NW $\frac{1}{4}$, SE $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 23, T. 23 N., R. 5 E; 800 feet east and 450 feet north of road intersection.

Climate: Humid continental; average annual temperature is about 43° F; mean annual precipitation is 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Natural vegetation was sedges and water-tolerant trees. Much of this land is in pasture or woodland.

Parent material: Silty sediments over clayey residuum from schist bedrock.

Physiography: Depressions in rock-controlled upland.

Topography: Nearly level; slope of 1 percent in an old pasture.

Drainage: Poorly drained.

Ground water: 260 cm.

Erosion: Slight.

Permeability: Slow.

Described by: Paul H. Carroll.

(Colors are for moist conditions unless otherwise stated)

Ap 70L924 0 to 21 cm (0 to 8 inches). Very dark grayish brown (10YR 3/2) silt loam, gray (10YR 6/1) to light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; many fine fibrous roots; neutral; abrupt smooth boundary.

A2g 70L925 21 to 30 cm (8 to 12 inches). Grayish brown (2.5Y 5/2) silt loam with many medium prominent mottles of yellowish brown (10YR 5/6-5/8); weak fine subangular blocky structure; friable; common fine fibrous roots; strongly acid; clear smooth boundary.

A&Bg 70L926 30 to 43 cm (12 to 17 inches). Grayish brown (2.5Y 5/2) silt loam (A2) with many medium prominent mottles of yellowish brown (10YR 5/6-5/8); moderate fine and medium subangular blocky structure; friable; strong brown (7.5YR 5/6-5/8) heavy silt loam Bt remnants are scattered through the horizon and occupy about 25 percent of the soil volume; common fine fibrous roots; few thin clay films on faces of peds and in tubular pores of the Bt portion of the horizon; strongly acid; clear wavy boundary.

B&Ag 70L927 43 to 58 cm (17 to 23 inches). Dark grayish brown (2.5Y 4/2) and brown (7.5YR 5/2) silty clay loam (Bt) with many fine and medium prominent mottles of strong brown (7.5YR 5/6-5/8) and reddish brown (5YR 4/4); strong medium prismatic structure parting to moderate fine angular blocky structure; very firm; many thin very dark grayish brown (10YR 3/2) clay films on faces of peds and in tubular pores of the Bt part of the horizon; grayish brown (2.5Y 5/2) tongues of silt loam (A2) penetrate the horizon from above and occupy about 20 percent of the soil volume; few fine fibrous roots; less than 1 percent fine and medium polished rounded and subrounded quartz pebbles; strongly acid; clear wavy boundary.

IIB21t 70L928 58 to 72 cm (23 to 28 inches). Dusky red (10R 3/3-3/4) clay with common fine reddish black (10R 2/1) manganese spots; moderate medium prismatic structure parting to moderate fine angular blocky structure; very firm; few fine roots; continuous thin dark reddish brown (5YR 3/2) clay films on faces of peds and in continuous tubular pores; less than 1 percent fine and medium polished rounded and subrounded quartz pebbles; strongly acid; gradual wavy boundary.

IIB22t 70L929 72 to 96 cm (28 to 38 inches). Dusky red (10R 3/4) clay; moderate medium prismatic structure parting to weak fine angular blocky structure; very firm; common thin reddish brown (5YR 4/4) clay films on faces of angular blocky peds and continuous on faces of prisms and in tubular pores; less than 1 percent fine and medium polished rounded and subrounded quartz pebbles; few light reddish brown (5YR 6/4) weathered rock fragments 1 to 2 mm in size distributed through horizon; neutral; gradual wavy boundary.

IIB23t 70L930 96 to 125 cm (38 to 49 inches). Dusky red (10R 3/3) clay; moderate medium and coarse prismatic structure parting to weak medium angular blocky structure; very firm; clay films thin and continuous on vertical faces of prisms; few weathered remnants of schist bedrock and less than 1 percent rounded and subrounded polished pebbles of quartz; mildly alkaline; gradual wavy boundary.

IIB3t 70L931 125 to 158 cm (49 to 62 inches). Dusky red (10R 3/3) clay; weak medium and coarse angular blocky structure; very firm; nearly continuous clay films along faces of widely-spaced cleavage planes; few fine polished rounded and subrounded quartz pebbles; mildly alkaline; clear wavy boundary.

IIC1 70L932 158 to 191 cm (62 to 76 inches). Dusky red (10R 3/2-3/4) and dark reddish brown (5YR 3/4-3/3) silty clay loam; very thin platy (rock fabric) structure; firm ranging to friable through pedon; many very fine (1 to 2 mm) light reddish brown (5YR 6/4) weathered fragments from micaceous schist bedrock; neutral; clear smooth boundary.

IIC2 70L933 191 to 234 cm (76 to 93 inches). Brownish yellow (10YR 6/8), dark reddish brown (5YR 3/2-3/3) and dusky red (10R 3/2-3/3) very fine sandy loam; weak very fine platy (rock fabric); firm; 5 to 10 percent fine (approximately 2 mm) rock fragments from micaceous schist bedrock; neutral; clear smooth boundary.

IIC3 70L934 234 to 279 cm (93 to 107 inches). Variegated pale brown (10YR 6/3), pale green (5G 6/2) olive yellow (2.5Y 6/6-6/8), and olive (5Y 5/6) very fine sandy loam; weak very fine platy structure (rock fabric); friable; 5 to 10 percent (approximately 2 mm) rock fragments from micaceous schist rock; slightly acid.

Note: Soil temperature: 1-meter depth 59° F; 2-meter depth - 56° F. Vertical cracks of 1 to 2 cm extend from A&Bg to the B3 horizons, having resulted from a month-long period of drought. Cleavages developed along prism faces.

SOIL Amery taxadjunct SOIL Nos. S69WI-48-1 LOCATION Polk County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 69B293 - 69B300

Depth (cm)	Horizon	Size class and particle diameter (mm) 3A1														3B2 Cm	Coarse fragments 3B1		
		1B1b Total			Sand						Silt		<.074 mm Pct.	2A2 ≥ 2 Pct.	2 - 19 Pct.		19 - 76 Pct. of ≤ 76mm		
		Sand (2-0.05)	Silt (0.05- 0.002)	Clay (< 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02	Int. III (0.02- 0.002)	Int. II (0.2-0.02)						(2-0.1)	
Pct. of ≤ 2 mm																			
0-8	A1	53.1	40.9	6.0	1.7	9.7	14.6	16.1	11.0	22.5	18.4	41.1	42.1	55.0	0.99		3	0	

Soil classification: Glossic Entroboreal; coarse-loamy, mixed.

Soil: Amery taxadjunct*

Soil No.: 869WI-48-1.

Location: Polk County, Wisconsin; SW $\frac{1}{4}$, SE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 26, T. 34 N., R. 15 W.

Climate: Humid continental; mean annual temperature is about 45° F; mean annual precipitation is about 30 inches; and average frost-free season is 135 days.

Vegetation and land use: Native vegetation was mixed deciduous and coniferous forests with maple, birch, oak, aspen, and white pine predominate. About 50 percent of this soil is cultivated or used for live-stock pasture. Corn, small grain, and forages are the principal crops.

Parent material: Acid loamy sand glacial till.

Physiography: Sloping to hilly glacial ground and end moraines.

Topography: Site is a convex slope of about 5 percent near the top of a large hill.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: Paul H. Carroll.

(Colors are for moist soils unless otherwise stated)

A1 69B293 0 to 8 cm (0 to 3 inches). Very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) to light brownish gray (10YR 6/2) dry; moderate and weak fine subangular blocky and granular structure; friable; many roots; strongly acid; abrupt smooth boundary.

B1r 69B294 8 to 23 cm (3 to 9 inches). Dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) loam; weak very fine and fine subangular blocky structure; friable; many roots; strongly acid; clear wavy boundary.

A2 69B295 23 to 48 cm (9 to 19 inches). Brown (7.5YR 5/2 to 5/3) sandy loam; weak thin platy structure with numerous imbedded and exposed vesicles; very friable; contains 6 to 8 percent gravel and cobblestones; many roots; medium acid; clear wavy boundary.

A&B 69B296 48 to 66 cm (19 to 26 inches). Brown (7.5YR 4/4) light sandy loam A2 material occupies approximately 75 percent of the horizon, extending as tongues into or completely surrounding isolated remnants of reddish brown (5YR 4/4) or yellowish red (5YR 4/6) sandy loam B2t material; weak thin platy structure in the A2 material and weak medium subangular blocky structure in the B2t material; clay films are thin and patchy on the subangular blocky faces of peds; firm with slightly fragic consistence; contains 8 to 10 percent by volume of gravel and cobblestones; common roots; slightly acid; gradual wavy boundary.

B&A 69B297 66 to 89 cm (26 to 35 inches). Reddish brown (5YR 4/4) and yellowish red (5YR 4/6) sandy loam B2t material occupies approximately 70 percent of the horizon and has tongues and interfingers of brown (7.5YR 4/4) loamy sand and light sandy loam that penetrate the horizon from above; weak and moderate fine and medium subangular blocky structure in the B2t portion; clay films are thin and patchy on faces of peds but more numerous than in horizon above; firm in B2t, friable in A2 and slightly fragic throughout; contains 8 to 10 percent by volume of gravel and cobblestones; common roots; slightly acid; gradual wavy boundary.

B2t 69B298 89 to 112 cm (35 to 44 inches). Reddish brown (5YR 4/4) and yellowish red (5YR 4/8) sandy loam; weak and moderate medium subangular blocky structure with weak coarse petrogenic platiness throughout; firm; occasional tongues of A2 material from above penetrate this horizon; thin patchy clay films on faces of peds; contains 8 to 10 percent by volume of gravel and cobblestones; few roots; slightly acid; gradual wavy boundary.

B3 69B299 112 to 137 cm (44 to 54 inches). Reddish brown (5YR 4/4) and yellowish red (5YR 4/6) light sandy loam.

SOIL AmerySOIL Nos. S69WI-48-2LOCATION Polk County, WisconsinSOIL SURVEY LABORATORY Beltsville, MarylandLAB. Nos. 69B301 - 69B308

Depth (cm)	Horizon	Size class and particle diameter (mm) 3A1													3B2 Cm	Coarse fragments 3B1									
		181b Total			Sand					Silt			<.074 mm Pct.			2A2 > 2 Pct.	2-19 Pct.	19-76 Pct. of < 76mm							
		Sand (2-0.05)	Silt (0.05- 0.002)	Clay (= 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02	Int. III (0.02- 0.002)	Int. II (0.2-0.02)													
												(2-0.1)													
Pct. of < 2 mm																									
0-6	A1	55.4	37.4	7.2	2.5	12.3	15.3	16.4	9.0	17.9	19.5	34.8	46.4	50.2	0.96	10	6	4							
6-25	B1r	58.5	36.4	5.1	3.4	10.9	16.1	18.1	10.0	19.1	17.3	37.8	48.5	47.9	0.93	12	10	2							
25-43	A2	69.7	26.1	4.2	5.3	13.6	18.5	21.3	11.0	14.0	12.1	35.4	58.7	36.9	0.87	19	15	4							
43-65	A&B	72.5	20.3	7.2	6.7	15.7	19.9	20.9	9.4	8.6	11.7	28.5	63.1	32.7	0.79	28	24	4							
65-79	B&A	67.3	21.1	11.6	4.2	12.0	17.8	22.7	10.6	10.5	10.6	32.6	56.7	38.3	0.80	27	17	10							
79-125	B2t	66.9	20.0	13.1	6.7	14.4	16.9	19.8	9.2	9.2	10.8	28.2	57.7	38.1	0.82	24	16	8							
125-155	B3t	75.5	14.9	9.6	6.8	17.9	22.2	21.1	7.5	6.9	8.0	24.0	68.0	28.4	0.79	28	23	5							
155-178	C	69.3	18.6	12.1	4.9	13.7	18.6	22.2	9.9	9.1	9.5	30.1	59.4	36.0	0.84	22	16	6							
Depth (cm)	6A1a Organic carbon Pct.	Na Pyro. ext.		C-D Al Pct.	Carbonate as CaCO ₃ Pct.	Ext. iron as Fe Pct.	Plasti- city Index	Bulk density		4D1 COLE	Water content			8E1 Resis- tivity ohms= cm 60°F	4C1 WRD in/in	pH									
		6C5a Fe Pct.	6G5a Al Pct.					4A1e 1/2 bar g/cc	4A1h Oven dry g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	8C1c (1:2) CaCl ₂			8C1e (1:1) KCl	8C1a (1:1) H ₂ O								
		Pct.	Pct.					g/cc	g/cc		Pct.	Pct.	Pct.			CaCl ₂	KCl	H ₂ O							
0-6	3.45	0.2	0.1	0.1		0.9		1.05	1.18	0.04		23.1	7.3		0.17	5.0	4.7	5.3							
6-25	0.95	0.2	0.2	0.1		0.7		1.51	1.54	0.01		13.7	2.9		0.16	4.5	3.9	5.1							
25-43	0.23			0.1		0.7		1.73	1.74	0.00		9.9	2.0		0.14	4.6	4.0	5.4							
43-65	0.24			0.1		0.8		1.79	1.84	0.01		10.0	3.3		0.12	4.7	3.8	5.2							
65-79	0.24			0.1		0.9		1.79	1.85	0.01		12.2	4.4		0.14	4.8	4.0	5.4							
79-125	0.12			0.1		1.0	N.P.	1.82	1.90	0.01		10.7	4.9	10000	0.11	5.0	4.0	5.5							
125-155	0.12			tr.		0.7		1.82	1.91	0.01		11.2	3.7	10000	0.14	5.1	4.1	5.8							
155-178	0.24			tr.		0.8		1.81	1.89	0.01		10.0	4.4	10000	0.10	5.1	4.0	5.7							
Depth (cm)	Extractable bases 5B4a					6H2e Ext. acidity	CEC		6G1e Ext. Al	Fine clay <.0002 mm Pct.	Ratios to clay 8D1			8O3 Ca/Mg	Base saturation										
	6N2e Ca	6O2d Mg	6P2b Na	6Q2b K	Sum		5A3a Sum cations	5A6a NH ₄ OAc			CEC sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.									
	meq/100 g																								
0-6	7.9	1.7	tr.	tr.	9.6	11.2	20.8	13.7	tr.		2.8	2.89	0.13	1.01	46	70									
6-25	0.9	0.4	tr.	tr.	1.3	7.4	8.7	5.5	1.2		0.9	1.70	0.14	0.57	15	24									
25-43	1.0	0.3	tr.	tr.	1.3	3.5	4.8	3.9			0.4	1.14	0.17	0.48	27	33									
43-65	2.3	0.9	tr.	tr.	3.2	4.3	7.5	5.7	0.5		1.4	1.04	0.11	0.46	43	56									
65-79	3.3	1.4	tr.	tr.	4.7	4.1	8.8	7.1			3.3	0.76	0.08	0.38	53	66									
79-125	4.8	1.8	tr.	tr.	6.6	3.5	10.1	8.2			4.3	0.77	0.08	0.37	65	80									
125-155	4.1	1.5	tr.	tr.	5.6	2.5	8.1	7.0			3.3	0.84	0.07	0.38	69	80									
155-178	4.2	1.8	tr.	tr.	6.0	3.1	9.1	7.6			4.6	0.75	0.07	0.36	66	79									
Depth (cm)	Clay fraction analysis 7A1					7A3 DTA b/ Pct.	Sand fraction analysis 7A1					TW													
	< 0.002 mm 7A2 X-ray a/b/ Pct.						0.2-0.02 mm 7B1 Petrographic b/ Pct.																		
0-6	MV3, MI1, KK1, QZ1					KK10	QZ67, FE4, PO<1, FD22, EP4, HN1, TA1, MS<1, AU<1					28													
6-25	VR4, KK3, QZ2, MT1, MI1, CL1, FD1					KK20	QZ73, FE1, ZR<1, PO<1, FD17, EP5, HN1, TA1, GN1, MS<1, VR<1					25													
25-43																									
43-65																									
65-79																									
79-125	MV4, KK2, CL1, MI1, QZ1, FD1					KK15	QZ74, FE1, FD18, EP2, VR2, HN1, TA1, MS<1, BT<1					24													
125-155																									
155-178	MV5, MI2, KK2, QZ1, FD1					KK15	QZ77, FE2, ZR<1, SR<1, FD14, EP2, HN1, MS1, VR1, TA1					20													

a/Relative amounts (X-ray): 5 = dominant, 4 = abundant, 3 = moderate, 2 = small, 1 = trace.

b/Mineral code: MV = montmorillonite-vermiculite, MI = mica, KK = kaolinite, QZ = quartz, FE = iron oxides,
PO = plant opal, FD = feldspar, EP = epidote, HN = hornblende, TA = talc, MS = muscovite, AU = augite,
VR = vermiculite, MT = montmorillonite, CL = chlorite, ZR = zircon, GN = garnet, BT = biotite, SP = sphene.

Soil classification: Typic Glossoboralfs; coarse-loamy, mixed.

Soil: Amery.

Soil No.: 869WI-48-2.

Location: Polk County, Wisconsin; NW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 3, T. 33 N., R. 15 W.; 200 yards west and 100 feet south of turn in county road.

Climate: Humid continental; mean annual temperature is about 45° F., mean annual precipitation is about 30 inches, and average frost-free season is 135 days.

Vegetation and land use: Native vegetation was mixed hardwood and pine with oak, maple, birch, aspen, ash, and white pine. Much of this soil is used for crop production and livestock pasture. Corn, small grain, and forage are the principal crops.

Parent material: Acid loamy sand to sandy loam glacial till.

Physiography: Sloping to hilly glacial ground and recessional moraines.

Topography: Site is on a convex slope of about 3 percent near the top of the hill.

Drainage: Well and moderately well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate and moderately slow.

Described by: Paul H. Carroll.

(Colors are for moist soils unless otherwise noted)

A1 69B301 0 to 6 cm (0 to 2 inches). Very dark grayish brown (10YR 3/2) loam, gray (10YR 6/1) dry; weak and moderate fine subangular blocky structure; many roots; strongly acid; abrupt smooth boundary.

B1r 69B302 6 to 25 cm (2 to 10 inches). Dark brown (7.5YR 4/4) fine sandy loam; weak fine and very fine subangular blocky structure; friable; many roots; medium acid; clear wavy boundary.

A2 69B303 25 to 43 cm (10 to 17 inches). Dark brown (7.5YR 4/4) and brown (10YR 5/3) sandy loam; weak fine and very fine subangular blocky structure; friable; contains 6 to 8 percent by volume of gravel and cobblestones; common roots; medium acid; clear wavy boundary.

A&B 69B304 43 to 65 cm (17 to 26 inches). Dark brown (7.5YR 4/4) eluviated light sandy loam occupies 50 to 60 percent of the volume of the horizon and tongues into or completely surrounds isolated remnants of dark reddish brown (5YR 3/4) sandy loam B2t material; weak and moderate medium subangular blocky structure, with the A2 material having the weaker structure; friable; few thin clay films on faces of peds of the B2t; contains 8 to 10 percent by volume of gravel and cobblestones; common roots; strongly acid; clear wavy boundary.

B&A 69B305 65 to 79 cm (26 to 31 inches). Dark reddish brown (5YR 3/4) sandy loam with tongues of dark brown

SOIL Amery SOIL Nos. S69WI-54-1 LOCATION Rusk County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 69B248 - 69B254

Depth (cm)	Horizon	Size class and particle diameter (mm) 3A1															3B2 Cm	Coarse fragments 3B1		
		Total			Sand					Silt		Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)	<.074 mm Pct.	2A2 ≥ 2 Pct.		2-19 Pct. of ≤ 76mm	19-76 Pct. of ≤ 76mm	
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02										
		Pct. of ≤ 2 mm																		
0-10	A1	52.9	39.3	7.8	3.2	13.7	14.6	14.6	6.8	17.1	22.2	30.6	46.1	51.0	1.00	2	2	0		
10-12	A2	NOT SAMPLED																		
12-26	Bir	52.5	39.7	7.8	2.8	10.8	14.3	16.0	8.7	20.1	19.6	36.7	43.8	52.9	0.94	9	8	1		
26-46	A'2	67.2	28.2	4.6	5.0	13.7	17.1	20.9	10.5	14.9	13.3	35.8	56.7	38.7	0.89	15	12	3		
46-62	A&B'	74.1	19.9	6.0	5.9	14.5	18.7	23.9	11.1	10.8	9.1	34.1	63.0	31.9	0.84	20	10	10		
62-75	B'2t	73.8	17.0	9.2	3.3	10.7	20.8	27.8	11.2	9.3	7.7	34.4	62.2	32.1	0.81	25	13	12		
75-115	B'3tx	74.3	18.0	7.7	4.8	13.2	17.9	25.2	13.2	10.3	7.7	37.0	61.1	32.8	0.83	23	17	6		
115-150	Cx	77.6	18.4	4.0	8.4	17.5	18.7	22.1	10.9	10.0	8.4	32.1	66.7	28.4	0.73	34	21	13		
Depth (cm)	6A1a Organic carbon	6A1a PVRP, ext.					Plasti- city Index	Bulk density		4D1 COLE	Water content			8B1 Resis- tivity ohms- cm 60°F	4C1 WRD in/in	pH				
		6C5a Fe	6G5a Al	C-D Al	Carbonate as CaCO ₃	Ext. iron as Fe		4A1a g/cc	4A1b Oven dry g/cc		4B1c g bar	4B2 15 bar	8C1c (1:2) CaCl ₂			8C1a (1:1) KCl	8C1a (1:1) H ₂ O			
		Pct.	Pct.	Pct.	Pct.	Pct.		Pct.	Pct.		Pct.	Pct.	Pct.			Pct.	Pct.			
0-10	6.15			0.1		0.5		1.09	1.19	0.03		26.3	12.5		0.15	5.5	5.3	5.9		
10-12				0.1		0.7		1.59	1.67	0.02		12.5	4.2		0.13	4.5	4.0	5.2		
12-26	0.89	0.1	0.1	0.1		0.5		1.77	1.79	0.00		9.0	2.5		0.11	4.5	3.9	5.3		
26-46	0.25			0.1		0.6		1.95	1.96	0.00		6.0	2.7		0.06	4.7	4.0	5.5		
46-62	0.13			tr.		0.8	N.P.	1.83	1.88	0.01		9.1	3.9	10000	0.10	5.0	4.1	5.4		
62-75	-	0.5	0.2	tr.		0.6		1.84	1.90	0.01		8.8	3.0	15000	0.11	5.2	4.1	5.9		
75-115	tr.			tr.		0.4	N.P.	1.88	1.92	0.01		7.6	1.7		0.11	5.5	4.4	6.2		
115-150	0.12	0.5	0.2	tr.																
Depth (cm)	Extractable bases 5B4a					6N2a Ext. acidity	CEC		6G1e Ext. Al	Fine clay <.0002 mm Pct.	Ratios to clay 8D1			8D3 Ca/Mg	Base saturation					
	6N2e Ca	6O2d Mg	6P2b Na	6Q2b K	Sum		6A3a Sum cations	5A6a NH ₄ OAc			CEC sum	Ext. Iron	15-bar water		5C3 Sum cations	5C1 NH ₄ OAc				
	meq/100 g															Pct.	Pct.			
0-10	13.9	10.9	tr.	tr.	24.8	15.0	39.8	24.7		2.6	5.10	0.06	1.60		62	100				
10-12																				
12-26	1.5	0.6	tr.	tr.	2.1	9.9	12.0	7.0	1.4	2.0	1.54	0.09	0.54		18	30				
26-46	1.1	0.6	tr.	tr.	1.7	8.3	10.0	4.5	0.8	0.4	2.17	0.11	0.54		17	38				
46-62	1.8	1.0	tr.	tr.	2.8	4.1	6.9	4.9		1.7	1.15	0.10	0.45		40	57				
62-75	2.9	1.5	tr.	tr.	4.4	7.1	11.5	6.2		3.7	1.25	0.09	0.42		38	70				
75-115	2.8	1.4	tr.	tr.	4.2	1.5	5.7	5.9		3.1	0.74	0.08	0.39		74	71				
115-150	1.9	1.0	tr.	tr.	2.9	0.6	3.5	3.7		1.4	0.88	0.10	0.42		83	78				
Depth (cm)	Clay fraction analysis 7A1					Sand fraction analysis 7A1					TW									
	< 0.002 mm 7A2 X-ray a/b/ Pct.		7A3 DTA b/ Pct.			0.2-0.02 mm 7B1 Petrographic b/ Pct.														
0-10 12-26 26-46	MV4,MI1,KK1,QZ1,FD1					KK5					QZ77,FE2,TM*1,ZR*1,SP*1,PO*1,FD15,HN4,EP*1					19				
46-62 62-75 75-115	MV5,MI1,KK1					KK5					QZ77,FE1,ZR1,SP*1,FD12,HN4,EP1,GN1,VR1,TA1,MS*1,AUK*1					20				
115-150	MV5,MI1,KK1,QZ1					KK5					QZ73,FE1,FD23,HN1,MS*1,TA*1,EP*1,VR*1,GN*1					24				

a/Relative amounts (X-ray): 5 = dominant, 4 = abundant, 3 = moderate, 2 = small, 1 = trace.

b/Mineral code: MV = montmorillonite-vermiculite, MI = mica, KK = kaolinite, QZ = quartz, FD = feldspar,
FE = iron oxides, TM = tourmaline, ZR = zircon, SP = sphene, PO = plant opal, HN = hornblende, EP = epidote,
GN = garnet, VR = vermiculite, TA = talc, MS = muscovite, AU = augite.

Soil classification: Typic Glossoboralfs; coarse-loamy, mixed.

Soil: Amery.

Soil No.: S69WI-54-L

Location: Rusk County, Wisconsin; SW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 7, T. 34 N., R. 6 W; 200 feet west and 1100 feet south of "T" road intersection.

Climate: Humid continental; mean annual temperature is about 42° F., mean annual precipitation is about 30 inches, and average frost-free season is 125 days.

Vegetation and land use: Native vegetation was mixed northern hardwood forest. Much of this soil is used for livestock pasture and crop production. Principal crops are small grain, corn, and forage.

Parent material: Acid sandy loam glacial till.

Physiography: Sloping to hilly glacial ground and end moraines.

Topography: Site is on a convex slope near the top of a ridge.

Drainage: Moderately well and well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderately slow and moderate.

Described by: Paul H. Carroll.

(Colors are for moist soils unless otherwise stated)

A1 69B248 0 to 10 cm (0 to 4 inches). Very dark grayish brown (10YR 3/2) loam, light gray (10YR 6/1) dry; weak fine subangular blocky structure; friable; common roots; slightly acid; abrupt smooth boundary.

A2 (Not sampled) 10 to 12 cm (4 to 5 inches). Dark grayish brown (10YR 4/2) and grayish brown (10YR 5/2) loam; weak thin platy structure; very friable; common roots; medium acid; abrupt smooth boundary.

B1r 69B249 12 to 26 cm (5 to 10 inches). Dark brown (7.5YR 4/4) loam; weak fine subangular blocky structure; friable; common roots; medium acid; clear wavy boundary.

A'2 69B250 26 to 46 cm (10 to 18 inches). Grayish brown (10YR 5/2) and brown (7.5YR 5/2) sandy loam; weak thin platy structure; friable; contains 5 to 7 percent by volume of gravel and cobblestones; common roots; strongly acid; clear wavy boundary.

ASB' 69B251 46 to 62 cm (18 to 24 inches). Grayish brown (10YR 5/2) and brown (7.5YR 5/2) light sandy loam A'2 material interfingers and tongues into the underlying reddish brown (5YR 4/4) to yellowish red (5YR 4/8) sandy loam B'2t material; weak thin platy A'2 and weak medium subangular blocky B'2t; friable; tongues of A'2 material are 2 to 6 cm thick; contains 10 to 12 percent by volume of gravel and cobblestones; common roots; strongly acid; clear irregular boundary.

B'2t 69B252 62 to 75 cm (24 to 30 inches). Reddish brown (5YR 4/4) and yellowish red (5YR 4/6-4/8) sandy loam; the higher chroma colors are marginal to thin gray (5YR 5/1-6/1) horizontal bands (1 to 2 cm thick) of clayey material situated near the horizon's upper boundary; moderate medium subangular blocky structure with weak to moderate coarse platiness throughout; friable and firm; thin patchy clay films on subangular blocky faces of peds; fibrous roots interlace with one another at lower boundary where horizon contacts the underlying fragipan; contains 10 to 12 percent by volume of gravel and cobblestones; medium acid; clear wavy boundary.

B'3tx 69B253 75 to 115 cm (30 to 44 inches). Reddish brown (5YR 4/4) sandy loam with few fine distinct and prominent mottles of yellowish red (5YR 4/6-4/8); weak and moderate medium subangular blocky structure with weak coarse platiness throughout; firm; thin patchy dark reddish brown (5YR 3/4) clay films on faces of peds; contains 10 to 12 percent by volume of gravel and cobblestones; few roots; medium acid; gradual wavy boundary.

Cx 69B254 115 to 150 cm (44 to 60 inches). Reddish brown (7.5YR 4/4) sandy loam with loamy sand pockets; weak coarse platy structure that parts under pressure to weak medium subangular blocky structure; firm; occasional thin clay films on surfaces of plates; medium acid; contains 10 to 12 percent by volume of cobblestones and gravel.

SOIL Amery taxadjunct SOIL Nos. S69WI-54-4 LOCATION Rusk County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 69B270 - 69B276

Depth (cm)	Horizon	Size class and particle diameter (mm) 3A1												3B2 Cm	Coarse fragments 3B1		
		181b Total			Sand						Silt				2A2 ≥ 2	2 - 19	19 - 76
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (≤ 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02	Int. III (0.02-0.002)	Int. II (0.2-0.02)	(2-0.1)				
Pct. of ≤ 2 mm												Pct.	Pct.	Pct. of ≤ 76mm			

Soil classification: Dystric Eutrochrept; coarse-loamy, mixed.

Soil: Amery taxadjunct*.

Soil No.: 869WI-54-4.

Location: Rusk County, Wisconsin; NW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 7, T. 34 N., R. 6 W.; 180 yards north of road along pipeline and 15 feet northeast of large oak tree.

Climate: Humid continental; mean annual temperature is about 42° F; mean annual precipitation is about 30 inches; and average frost-free season is 125 days.

Vegetation and land use: Native vegetation was mixed northern hardwood forest. Much of the soil is used for live-stock pasture and crop production. Principal crops are small grain, corn, and forage.

Parent material: Acid sandy loam glacial till.

Physiography: Sloping to hilly glacial ground and end moraines.

Topography: Site is on a plane east facing 3 percent slope.

Drainage: Moderately well and well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate and moderately slow.

Described by: Paul H. Carroll.

(Colors are for moist soils unless otherwise noted)

A1 69B270 0 to 14 cm (0 to 6 inches). Very dark grayish brown (10YR 3/2) loam, gray (10YR 6/1) dry; weak fine subangular blocky structure; many roots; friable; strongly acid; clear smooth boundary.

B1r 69B271 14 to 27 cm (6 to 11 inches). Dark brown (7.5YR 4/4) light loam; weak fine subangular blocky structure; friable; many roots; strongly acid; clear wavy boundary.

A2 69B272 27 to 49 cm (11 to 19 inches). Brown (10YR 5/3) and yellowish brown (10YR 5/4) light loam; weak fine medium subangular blocky structure; friable; common roots; medium acid; clear wavy boundary.

B&A 69B273 49 to 65 cm (19 to 26 inches). Dark brown (7.5YR 4/4) sandy loam with brown (7.5YR 5/3-5/4) somewhat coarser textured tongues of eluviated material that penetrate the horizon and occupy 20 to 40 percent of the horizon body; weak medium subangular blocky structure in the B2t material and weak thin platy structure in the A2 material; friable; contains 8 to 12 percent gravel and cobblestones; common roots; medium acid; clear wavy boundary.

B2t 69B274 65 to 86 cm (26 to 34 inches). Dark reddish brown (5YR 3/4) sandy loam with many fine distinct strong brown (7.5YR 5/6) mottles; weak and moderate fine subangular blocky structure having weak medium platiness throughout; firm with slightly fragic consistence; thin patchy to nearly continuous clay films on most faces of peds; contains 8 to 12 percent gravel and cobblestones; few roots; medium acid; clear wavy boundary.

B3t 69B275 86 to 114 cm (34 to 45 inches). Dark reddish brown (5YR 3/4) and reddish brown (5YR 4/4) sandy loam with common fine distinct strong brown (7.5YR 5/6) mottles; weak coarse platy structure; firm with fragic consistence; clay films continuous on some horizontal faces of peds, patchy on others; contains 8 to 12 percent gravel and cobblestones; few roots; slightly acid; gradual wavy boundary.

C 69B276 114 to 152 cm (45 to 60 inches). Dark reddish brown (5YR 3/4) and reddish brown (5YR 4/4) sandy loam with many fine prominent strong brown (7.5YR 5/8) mottles; weak and moderate coarse platy structure; firm with slightly

cobblestones; slightly acid.

*This pedon is a taxadjunct to the Amery series because it lacks the subsoil clay accumulation typical of that series.

SOIL CLASSIFICATION-TYPIC GLOSSOBORALF
FINE-SILTY OVER SANDY OR SANDY-SKELETAL, MIXED
SERIES - - - - - ANTIGO

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S75W1-95-5 COUNTY - - - POLK

GENERAL METHODS - - 1A, 1B18, 2A1, 2B

SAMPLE NOS. 760203-760209

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO		
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	INTR	FINE	NON-	801	
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	TO	CLAY	
		PCT																	
000-025	AP	14.5	74.4	11.1	3.3	.6	3.3	2.7	.9	7.0	40.1	34.3		7.5	47.5	30		.64	
025-036	AZ	12.5	76.4	11.1	3.6	.2	2.2	1.9	.7	7.5	42.1	34.3		5.0	49.9	32		.45	
036-051	B6A	10.3	68.7	21.0	10.2	.2	1.2	1.1	.6	7.2	37.5	31.2		3.1	45.0	49		.42	
051-076	B2T	17.1	59.0	23.9	13.0	.2	1.6	1.6	1.0	12.7	35.9	23.1		4.4	49.1	54		.43	
076-086	B2B	60.8	24.2	15.0	6.9	3.2	21.9	21.9	6.8	7.0	14.6	9.6		53.8	23.5	46		.39	
086-109	2C1	92.7	3.1	4.2	1.0	1.9	36.6	43.8	9.9	.5	2.0	1.1		92.2	4.8	24		.45	
109-152	2C2	95.1	3.3	1.6		31.9	37.2	18.5	6.2	1.3	2.0	1.3		93.8	5.3				

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2										BULK DENSITY				WATER CONTENT				CARBONATE			
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3	OVEN	COLE	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E				
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-025	TR	0	0	TR	TR	92	TR	1.28	1.34	.016			28.2	7.1	.28			5.6	5.2			
025-036	TR	0	0	TR	TR	94	TR	1.48	1.55	.016			22.1	5.0	.26			5.7	5.2			
036-051	0	0	0	TR	TR	96	TR	1.49	1.61	.026			23.0	8.9	.21			5.3	4.5			
051-076	TR	0	0	TR	TR	94	TR	1.50	1.65	.033			24.3	10.2	.22			5.0	4.3			
076-086	5	0	TR	2	2	43	4	1.71	1.82	.020			13.6	5.8	.13			5.0	4.3			
086-109	10					7	2	1.64A			4.0C			1.9	.03			5.2	4.5			
109-152	35	0	5	28	15	3	46	1.60B			3.4C			1.6	.03			5.6	5.0			

DEPTH	ORGANIC MATTER		IRON C/N	PHOS 6C2B EXT FE PCT	EXTRACTABLE BASES				584A- SUM EXTB / 100	ACTY 6H1A BACL TEA G-	AL 6G1E KCL EXT -	ICAT 5A3A EXTB ACTY -	EXCH 5A6A NHAC -	RATIO 8D1 NHAC TO CLAY	RATIO 803 CA TO MG	CA 5F1 SAT NHAC PCT	(BASE 5C3 EXTB ACTY PCT	SAT) 5C1 NHAC PCT
	6A1A	6B1A			TOTL CA	6N2E MG	6O2D NA	6P2B K										
	ORGN	NITG																
	CARB																	
CM	PCT	PCT																
000-025	1.70	.156	11		7.5	1.0	TR	.1	8.6	7.5		16.1	12.4	1.12	7.5	60	53	69
025-036	.38	.043	9		4.8	.8	TR	.1	5.7	4.8		10.5	8.0	.72	6.0	60	54	71
036-051	.28	.038	7		7.0	2.4	.1	.2	9.7	8.1	.9	17.8	14.1	.67	2.9	50	54	69
051-076	.19				7.5	3.7	.1	.3	11.6	9.8	2.0	21.4	16.4	.69	2.0	46	54	71
076-086	.12				4.5	2.1	.1	.2	6.9	6.1	1.1	13.0	10.1	.67	2.1	45	53	68
086-109	.08				1.8	.7	TR	TR	2.5	2.1	.2	4.6	4.0	.93	2.6	45	54	63
109-152	.06				1.9	.7	TR	.1	2.7	2.2		4.9	3.6	2.25	2.7	53	55	75

DEPTH	SATURATED PASTE		NA	SE	SALT	GYP	SATURATION EXTRACT				ATTERBERG			
	8E1	8C1B	8A	5D2	8D5	6F1A	6A1A	6M1B	6O1B	6P1B	6Q1B	6A1A	6J1A	6M1A
CM	REST	PH	H2O	ESP	SAR	TOTL	EC	CA	MG	NA	K	CO3	HC03	CL
000-025														
025-036														
036-051														
051-076														
076-086														
086-109	17000	5.0	20.0											
109-152														

CLAY MINERALOGY (7A2C).

36-51 MT4 KK3 VR2 M11 CL1
51-76 MT4 KK3 VR1 M11 QZ1
76-86 MT4 KK3 M11 QZ1 VR1

RELATIVE AMOUNTS: (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.
MINERAL CODE: MT = MONTMORILLONITE MI = MICA KK = KAOLINITE CL = CHLORITE VR = VERMICULITE QZ = QUARTZ.

SAND MINERALOGY (7B1). PLACEMENT: MIXED.

036-51 VFNS - RE76 QZ74 FE1 PD1 TM ZR SP FD21 MS1 CL1 HN1 BT EP VR GN KK.

051-76 VFNS - RE72 QZ71 FE1 TM ZR SP FD25 HN2 MS1 EP CL GS KK.

076-86 VFNS - RE78 QZ76 FE2 ZR SP FD18 MS1 HN1 VR1 EP1 GN CL AU.

RELATIVE AMOUNTS: AS PERCENT.

MINERAL CODE: BT = BIOTITE CL = CHLORITE EP = EPIDOTE FD = FELDSPARS GS = GLASS HN = HORNBLende MS = MUSCOVITE
PD = PLANT OPAL QZ = QUARTZ TM = TOURMALINE ZR = ZIRCON RE = RESISTANT MINERALS FE = IRON MINERALS
SP = SPHENE VR = VERMICULITE GN = GARNET KK = KAOLINITE AU = AUGITE.

(A) CORE SAMPLE, METHOD 4A3A.

(B) ESTIMATED.

(C) SIEVED SAMPLE, METHOD 4B1A.

(D) LIQUID LIMIT AND PLASTIC INDEX BY USDA-SCS, SOIL MECHANICS LAB, LINCOLN, NE.

Soil classification: Typic Glossoboralfs; fine-silty over sandy or sandy-skeletal, mixed.

Soil: Antigo.

Soil No.: S75-WI-95-5.

Location: Polk County, Wisconsin; SE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 25, T. 34 N., R. 17 W.; 150 feet west of road and 800 feet north of Highway 8. About 45°25' N. latitude and 92°26' W. longitude.

Climate: Humid continental; mean annual temperature is 43° F; mean July temperature is 71° F; mean January temperature is 11.8° F; mean annual precipitation is 27.5 inches with about two-thirds of this occurring during the growing season; mean annual snowfall is 41.2 inches; the growing season averages 127 days. (Data from Amery, WI, weather bureau substation.)

Vegetation and use: Native vegetation was mixed northern hardwood and conifer forests. Most large areas of this soil have been cleared and are being used for general farming. This sample site is presently in old hay meadow.

Parent material: Thin loess mantle, 20 to 36 inches thick, and acid outwash sand and gravel.

Physiography: Nearly level to sloping outwash plains and stream terraces in glaciated region.

Topography: Nearly level plain; sample site has a plane slope of less than 1 percent.

Drainage: Well drained.

Ground water: Over 5 feet deep.

Erosion: Slight.

Permeability: Moderate in solum and rapid in substratum.

Described by: A.J. Klingelhoets and G.B. Lee, July 1975.

(Colors are for moist soil unless otherwise stated)

Ap 760203 0 to 25 cm (0 to 10 inches). Very dark grayish brown (10YR 3/2) silt loam; weak fine subangular blocky structure parting to moderate fine granular; friable; many roots; slightly acid; abrupt smooth boundary.

A2 760204 25 to 36 cm (10 to 14 inches). Brown (10YR 5/3) silt loam; moderate fine platy structure; friable; many roots; slightly acid; clear wavy boundary.

B&A 760205 36 to 51 cm (14 to 20 inches). Dark yellowish brown (10YR 4/4) silt loam (B2t); moderate fine subangular blocky structure; friable; occupies about 70 percent of the horizon; few thin patchy clay films on some faces of peds; tongues of brown (10YR 5/3) silt loam (A2) 10 to 20 mm thick extend to bottom of horizon; moderate fine platy structure; many roots; medium acid; clear wavy boundary.

B2t 760206 51 to 76 cm (20 to 30 inches). Dark yellowish brown (10YR 4/4) heavy silt loam; moderate medium subangular blocky structure; firm; thin patchy clay films on most faces of peds; many roots; medium acid; clear wavy boundary.

IIB3 760207 76 to 86 cm (30 to 34 inches). Dark brown (7.5YR 4/4) light loam; moderate medium subangular blocky structure; friable; few thin patchy clay films on faces of peds; about 6 percent cobbles and 10 percent coarser than 2 mm by volume of the matrix; many roots; medium acid; abrupt wavy boundary.

IIC1 760208 86 to 109 cm (34 to 47 inches). Dark brown and reddish brown (7.5YR 4/4 and 5YR 4/4) coarse sand; single grained; loose; stratified; estimated 10 percent by volume coarse fragments over 2 mm in diameter; few roots; medium acid; abrupt wavy boundary.

IIC2 760209 109 to 152 cm (47 to 60 inches). Dark brown (7.5YR 4/4) coarse sand and fine gravel; single grained; loose; stratified; estimated 40 percent by volume coarse fragments over 2 mm in diameter; few roots; medium acid.

Additional notes:

1. Some pedons have more evidence of degradation than the one sampled.
2. pH's in field determined by Truog kit.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

GENERAL METHODS- - -1A, 1B10, 2A1, 2B

SAMPLE NOS. 760196-760202

CLAY MINERALOGY (7A2C).
038-53 MT2 KK2 MI2 VR1
074-94 MT3 KK2 MI1 VR1
094-122 MT3 KK2 MI1
COMMENTS - CLAYS IN B AND C HORIZONS FAIRLY WELL ORDERED.
RELATIVE AMOUNTS - (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.
MINERAL CODE - MT = MONTMORILLONITE MI = MICA KK = KAOLINITE VR = VERMICULITE.
SAND MINERALOGY (7B1). PLACEMENT - MIXED.
038-53 VFNS - NW71 QZ67 CD3 ZR1 FK23 FP2 HN2 PR1 MS1 CL PO DU BT.
074-94 VFNS - NW74 QZ70 CD3 OP1 FK20 FP2 HN1 MS1 AR2 ZR TM PR CL.
094-122 VFNS - NW74 QZ70 CD3 FK20 FP2 HN2 AR1 OP ZR RU GN PR.
COMMENTS - MINERAL SUITE IN COARSE SILTS VERY SIMILAR TO VERY FINE SANDS.
RELATIVE AMOUNTS - AS PERCENT.
MINERAL CODE - NW = NON-WEATHERABLE AR = AGGREGATES BT = BIOTITE CL = CHLORITE HN = HORNBLENDE MS = MUSCOVITE
OP = OPAQUE PO = PLANT OPAL PR = PYROXENE QZ = QUARTZ TM = TOURMALINE ZR = ZIRCON
FK = POTASSIUM FELDSPAR FP = PLAGIOCLASE FELDSPAR CD = CHALCEDONY DU = DUMORTIERITE GN = GARNET
RU = RUTILE.
OBSERVATIONS ON NATURAL FABRIC WITH STEREOSCOPIC MICROSCOPE.
A26 038-053 CM 760198 DEFINITE DEPOSITIONAL CLAY IN CHANNELS, BARELY THICK ENOUGH TO OBSCURE MATRIX GRAINS WHICH
ARE PRINCIPALLY VERY FINE SAND AND COARSE SILT.
B216 053-074 CM 760199 DEFINITE CLAY/IRON DEPOSITION IN CHANNELS AND IN CRACKS (PROBABLE PED FACES). GRAINS
OBSCURED BUT SURFACE MORPHOLOGY OF MATRIX NOT SMOOTHED COMPLETELY. MATRIX IS THE SAME AS A26.
B226 074-094 CM 760200 DISTINCT CLAY/IRON DEPOSITION IN CHANNELS, IN CRACKS, AND IN PATCHES THROUGH MATRIX, LESS
DISTINCT PATCHES OF DEPOSITIONAL CLAY THROUGH MUCH OF MATRIX, MATRIX IS SAME AS A26.
EXPRESSION OF DEPOSITIONAL CLAY MORE PRONOUNCED WITH DEPTH. DEFINITE EVIDENCE OF CLAY MOVEMENT AND DEPOSITION

(A) LIQUID LIMIT AND PLASTIC INDEX BY USDA-SCS, SOIL MECHANICS LAB, LINCOLN, NE.

Soil classification: Typic Umbraqualf; fine-silty, mixed, frigid.

Soil: Barronett taxadjunct*.

Soil No.: S75WI-95-4.

Location: Polk County, Wisconsin; NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 22, T. 35 N., R. 15 W.; 150 feet south of road and 15 feet west of line fence. About 45°30' N. latitude and 92°13' W. longitude.

Climate: Humid continental; mean annual temperature is 43° F; mean July temperature is 71° F; mean January temperature is 11.8° F; mean annual precipitation is 27.5 inches; with about two-thirds of this occurring during the growing season; mean annual snowfall is 41.2 inches; the growing season averages 127 days (data from Amery, WI., weather bureau substation.)

Vegetation and land use: Native vegetation was water tolerant hardwoods, sedges, and grasses. Many of the larger areas of this soil have been partially drained and are used for livestock pasture and general farm crops. The sample site is in a grass meadow.

Parent material: Silty glacial lacustrine deposits.

Physiography: Depressional areas in glacial lake plains.

Topography: Depressional - site is on a 1 percent concave slope.

Drainage: Poorly drained.

Ground water: At 3 feet in July; at 4 feet in September.

Erosion: None.

Permeability: Moderately slow.

Described by: A. J. Klingelhoets and G. B. Lee, July 1975.

(Colors are for moist soil unless otherwise stated)

Ap 760196 0 to 25 cm (0 to 10 inches). Black (10YR 2/1) mucky silt loam; moderate medium subangular blocky structure parting to very fine subangular blocky; friable; many roots; slightly acid; abrupt smooth boundary.

A12 760197 25 to 38 cm (10 to 15 inches). Very dark gray (10YR 3/1) silt; weak medium platy structure; friable; many roots; slightly acid; clear wavy boundary.

A2g 760198 38 to 53 cm (15 to 21 inches). Grayish brown (10YR 5/2) silt; weak coarse platy structure; very friable; many fine prominent mottles of strong brown (7.5YR 5/6 and 5/8); few crawfish holes and sedge root channels; many roots; medium acid; gradual wavy boundary.

B21tg 760199 53 to 74 cm (21 to 29 inches). Grayish brown (2.5Y 5/2) silt loam; many medium prominent brown, strong brown, and yellowish red (7.5YR 4/4, 5/6, and 5YR 5/6) mottles; few penetrations of A2g material less than 10 mm thick are in the upper 4 inches of this horizon; many old sedge root channels and few crawfish holes; many roots; medium acid; gradual wavy boundary.

B22g 760200 74 to 94 cm (29 to 37 inches). Grayish brown (2.5Y 5/2) silt loam; many large prominent dark reddish brown and yellowish red (5YR 3/4 and 5/6) mottles; weak coarse prismatic structure parting to weak fine and medium subangular blocky; friable; many old sedge root channels and few crawfish holes; few sedge roots; medium acid; gradual wavy boundary.

C1 760201 94 to 122 cm (37 to 48 inches). Grayish brown (2.5Y 5/2) silt; many coarse prominent dark reddish brown (5YR 3/4) and yellowish red (5YR 5/6) mottles; weak coarse platy structure; friable; few sedge roots; silt shows evidence of layering; medium acid; abrupt smooth boundary.

C2 760202 122 to 152 cm (48 to 60 inches). Grayish brown (2.5Y 5/2) silt; many coarse prominent dark reddish brown (5YR 3/4) and yellowish red (5YR 5/6) mottles; weak coarse platy structure; friable; few old sedge root channels and crawfish holes; silt shows evidence of stratification; medium acid. C2 horizon separated for purposes of sampling.

*This pedon is a taxadjunct to the Barronett series because it has a subsoil clay accumulation not typical of that series.

Additional notes:

1. Some accumulation has thickened the surface soil on this site; questioned for coarse-silty versus fine-silty family and for cambic versus argillic Bg.
2. pH's in field determined by Truog Kit.

Soil classification: Aerlic Haplaquept; very-fine, mixed, nonacid, frigid.

Soil: Bergland.

Soil No.: S64WT-16-2.

Location: Douglas County, Wisconsin; NW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 17, T. 48 N., R. 13 W.; 325 feet south of the road.

Climate: Humid continental; mean annual temperature is about 41° F; mean annual precipitation ranges from 26 to 30 inches; and frost-free season is about 109 days.

Vegetation and land use: Native vegetation was mixed spruce-pine forest. A small part of this soil has been cleared for general livestock farming. Much of this soil has been logged and is in second-growth aspen, tag alder, and willow brush.

Parent material: Calcareous clay lacustrine or glacial till.

Physiography: Slight depressional areas and drainageways on gently undulating lacustrine or till plain.

Topography: Site is in a slight depression with a 1 percent concave slope in an old pasture.

Drainage: Poorly drained.

Ground water: A perched water table exists at or near the surface for several months in most years.

Erosion: Slight.

Permeability: Very slow.

Described by: A.J. Klingelhoets, August 25, 1964.

(Colors are for moist soil unless otherwise stated)

01 19863 5 to 0 cm (2 to 0 inches). Very dark brown (10YR 2/2) organic mat of fine roots, sedge, moss, and leaf litter.

A1 19864 0 to 8 cm (0 to 3 inches). Black (2.5Y 2/0) silty clay; moderate medium granular structure; friable.

very high organic matter content; many fine roots; slightly acid; clear wavy boundary.

B1g 19865 8 to 18 cm (3 to 7 inches). Grayish brown (2.5Y 5/2) clay; moderate fine angular blocky structure; very firm, plastic, sticky; many fine prominent mottles of strong brown (7.5YR 5/6); thin patchy clay films; roots common; slightly acid; gradual irregular boundary.

B2 19866 18 to 28 cm (7 to 11 inches). Reddish brown (5YR 4/4) clay; weak coarse prismatic structure parting to strong very fine angular blocks; very firm, plastic, sticky; many fine distinct mottles of strong brown and brown (7.5YR 5/6 and 5/2); thin continuous clay films; roots common; mildly alkaline; gradual wavy boundary.

B3 19867 28 to 48 cm (11 to 19 inches). Reddish brown (2.5YR 4/4) clay; weak coarse prismatic structure parting to moderate very fine angular blocks; very firm, plastic, sticky; few fine faint mottles of strong brown (7.5YR 5/6); thin continuous clay films; roots common; mildly alkaline; clear wavy boundary.

C1ca 19868 48 to 71 cm (19 to 28 inches). Reddish brown (2.5YR 4/4) clay; weak coarse prismatic structure parting to moderate fine angular blocks; very firm, plastic, sticky; few pinkish gray (5YR 7/2 and 6/2) soft lime segregations less than 10 mm in diameter; clay films prominent on pressure faces along vertical cracks and old root channels; few sedge roots; strong effervescence; gradual wavy boundary.

C2ca 19869 71 to 97 cm (28 to 38 inches). Reddish brown (2.5YR 4/4 to 5/4) clay; moderate fine angular blocky structure; very firm, plastic, sticky; prominent slickensides with thick clay films on pressure faces; few pinkish gray (5YR 6/2) soft lime segregations less than 10 mm in diameter; some lime coatings with a greenish cast along old root channels and vertical cleavage planes; few sedge roots; strong effervescence; gradual wavy boundary.

C3 19870 97 to 127 cm (38 to 50 inches). Reddish brown (2.5YR to 5YR 4/4) clay; moderate coarse subangular blocky structure parting to moderate fine angular blocks; very firm, plastic, sticky; slickensides with thick clay films are prominent; some lime coatings with greenish gray (5G 5/1) colors are on the slickenside faces; strong effervescence.

Remarks: This profile is in a very fine family. Sand content is low and clay content is high. At time of sampling, a perched water table existed at the bottom of the B3 horizon and the entire solum above was saturated.

Soil temperatures:	Depth (inches)	Temperature
	20	10° C.
	30	8° C.
	40	8° C.

SOIL Bergland SOIL Nos. S64WI-16-4 LOCATION Douglas County, Wisconsin
 SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 19871-19879 June, 1968
 GENERAL METHODS: 1A, 1E1b, 2A1, 2B

GENERAL METHODS: 1A, 1B1, 2A1, 2B																														
Depth (in.)	Horizon	Size class and particle diameter (mm)											3A1																	
		Total			Sand					Silt			Int. II (0.2-0.02)	(2-0.1)	<0.074	0.005- 0.002	Coarse fragments 2A2													
		Sand (2-0.05) %	Silt (0.05- 0.002)	Clay (= 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02	Int. III (0.02- 0.002)	3B2 Vol.					3B1 Wt.													
																		Pct. of < 2 mm											19-2 19-2	
Pct. of < 19																														
1-0	01																													
0-4	A1	0.9	31.9	67.2	0.1	0.1	0.1	0.4	0.2	4.1	27.8	4.6	0.7	99.2	11.9	-	-													
4-8	B1g	5.8	33.3	60.9	0.3	0.9	0.8	2.4	1.4	4.2	29.1	7.0	4.4	99.2	14.0	-	-													
8-12	B21g	1.1	24.7	74.2	tr	0.2	0.3	0.4	0.2	1.7	23.0	2.1	0.9	99.0	-	-	-													
12-19	B22	0.7	32.4	66.9	-	0.1	0.2	0.2	0.2	0.7	31.7	1.0	0.5	99.4	-	-	-													
19-24	B3	0.5	34.9	64.6	tr	tr	0.1	0.2	0.2	1.3	33.6	1.6	0.3	99.6	-	-	-													
24-34	C1ca	1.2	32.1	66.7	0.6	0.3	0.1	0.2	-	0.4	31.7	0.5	1.2	98.8	20.1	-	-													
34-48	C2ca	0.8	30.3	68.9	0.1	0.2	0.1	0.2	0.2	1.1	29.2	1.4	0.6	99.3	24.0	-	-													
48-60	C3	0.5	20.0	79.5	0.1	0.1	0.1	0.1	0.1	1.4	18.6	1.6	0.4	99.5	-	-	-													
Depth (in.)	6A1a Organic carbon	6B1a Nitrogen	C/N	Carbonate as CaCO ₃		3A1a Non- Carbon- ate Clay Pct.	Bulk density			4D1 COLE	Water content				3A1b Fine Clay Pct.	pH														
				6E1b <2mm. Pct.	3A1a <0.002 mm. Pct.		4A1a Field- State g/cc	4A1d 1/3- Bar g/cc	4A1b Air- Dry g/cc		4B4 Field- State Pct.	4B1c 1/3- Bar Pct.	4B2 15- Bar Pct.	4C1 1/3-to 15-Bar mm. in./in.		8C1b Sat. Paste	8C1a (1:1)													
				Pct.	Pct.																									
1-0	16.7	1.057	16										39.6																	
0-4	9.58	0.643	15			67							30.7				5.3													
4-8	2.55					61							21.6		4.5		5.7													
8-12	0.33			tr(s)		74							22.8		29.2		7.0													
12-19	0.18			tr(s)		67	1.30	1.33	1.70	0.087	35.9	30.8	22.0	0.12			7.3													
19-24	0.16			7	-	65	1.34	1.35	1.62	0.064	32.7	29.5	21.7	0.11			7.9													
24-34	0.14			15	7	60	1.42	1.41	1.65	0.056	30.9	29.0	22.8	0.09			8.2													
34-48	0.12			16	9	69	1.39	1.38	1.64	0.059	33.7	31.7	22.2	0.13		7.6	8.2													
48-60	0.15			15	5	75	1.34	1.31	1.62	0.073	35.8	34.4	24.8	0.13			8.2													
Depth (in.)	Extractable bases				5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap.		6G1d KCl- Ext. Al	6C2a Ext. Iron as Fe Pct.	8E1 Resis- tivity ohms- cm.	8B1a Elec. Cond. mmhos/ cm.	8B Water at Sat. Pct.	8D5 Est. Total Salt in Soil mm.	8D3 Ca/Mg	Base saturation														
	6N4b Ca	6O4b Mg	6P2a Na	6Q2a K			5A3a Sum	5A1a NH ₄ OAc Cations								5C3 Sum Cations Pct.	5C1 NH ₄ OAc CEC Pct.													
1-0	20.0b	12.4c	0.2	0.8	33.4	38.5	71.9	46.8	0.4	1.1						1.6	46													
0-4	18.3b	13.6c	0.2	0.6	32.7	15.8	48.5	35.1		2.7		2,500	0.37	57.4	240	1.3	67													
4-8																	93													
8-12	21.2b	18.7c	0.4	0.8	41.1	5.9	47.0	38.4		1.9						1.1	87													
12-19	17.8	16.8	0.4	0.6	35.6	3.6	39.2	34.1		1.7						1.1	107													
19-24	18.0	14.6	0.4	0.6	33.6			30.2		1.7						1.2	104													
24-34	17.0	12.5	0.4	0.5	30.4			25.9		1.5						1.4														
34-48	15.1	11.8	0.4	0.6	27.9			23.7		1.4		2,000	0.45	60.0	290	1.3														
48-60	15.6	12.3	0.4	0.8	29.1			24.0		1.6						1.3														
Depth (in.)	Ratios to Clay 8D2																													
1-0																														
0-4	0.70	0.02	0.46																											
4-8	0.58	0.04	0.35																											
8-12	0.51	0.03	0.31																											
12-19	0.51	0.03	0.33																											
19-24	0.46	0.03	0.34																											
24-34	0.43	0.02	0.38																											
34-48	0.34	0.02	0.32																											
48-60	0.32	0.02	0.33																											
a. Fe-Mn nodules comprise a major portion of the sands above 19 inches. Carbonate comprises a major portion of the sands below 19 inches. b. NH ₄ OAc extraction (Method 6N2a). c. NH ₄ OAc extraction (Method 6O2a).																														

Soil classification: Aerlic Haplaquept; very-fine, mixed, nonacid, frigid.

Soil: Bergland.

Soil No.: 864WI-16-4

Location: Douglas County, Wisconsin; NW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 25, T. 48 N., R. 14 W; 400 feet east and 400 feet south of junction of county roads A and C.

Climate: Humid continental; mean annual temperature is about 41° F; mean annual precipitation ranges from 26 to 30 inches; and frost-free season is about 109 days.

Vegetation and land use: Native vegetation was mixed spruce-pine forest. Much of this soil has been logged and is in second growth aspen, tag alder, and willow brush. Small areas have been cleared for general livestock farming.

Parent material: Calcareous clay lacustrine or glacial till.

Physiography: Slight depressions and drainageways on gently undulating lacustrine or till plain.

Topography: Site is in a slightly depressed area on a 1 percent concave slope.

Drainage: Poorly drained.

Ground water: A perched water table exists at or near the surface for several months in most years.

Erosion: Slight.

Permeability: Very slow.

Described by: A.J. Klingelhoets, August 26, 1964.

(Colors are for moist soils unless otherwise stated)

O1 19871 3 to 0 cm (1 to 0 inch). Very dark brown (10YR 2/2) organic mat of fine roots, sedge leaves and stems, and leaf litter; slightly acid.

A1 19872 0 to 10 cm (0 to 4 inches). Very dark gray (2.5Y N3/) silty clay; moderate fine granular structure; friable; very high in organic matter content; many fine roots; slightly acid; clear wavy boundary.

B1g 19873 10 to 20 cm (4 to 8 inches). Very dark gray to dark gray (5Y 3/1 to 4/1) clay; moderate fine angular blocky structure; very firm, plastic, sticky; few fine prominent mottles of strong brown (7.5YR 5/6); thin patchy clay films; roots common; slightly acid; gradual irregular boundary.

B21g 19874 20 to 30 cm (8 to 12 inches). Reddish brown (5YR 4/4) clay; weak coarse prismatic structure parting to strong very fine angular blocks; very firm, plastic, sticky; many fine distinct mottles of strong brown and brown (7.5YR 5/6 and 5/2); few dark gray and very dark gray (5Y 4/1 and 3/1) tongues, less than 10 mm in width at the top, extend through this horizon; thin continuous clay films; roots common; mildly alkaline; gradual wavy boundary.

B22 19875 30 to 48 cm (12 to 19 inches). Reddish brown (2.5YR 4/4) clay; weak coarse prismatic structure parting to strong very fine angular blocks; very firm, plastic, sticky; few fine distinct mottles of strong brown (7.5YR 5/6); thin continuous clay films; roots common; mildly alkaline; clear wavy boundary.

B3 19876 48 to 61 cm (19 to 24 inches). Reddish brown (2.5YR 4/4) clay; weak coarse prismatic structure parting to moderate very fine angular blocks; very firm, plastic, sticky; few patchy dusky red (2.5YR 3/2) organic stains on vertical faces of peds along structural cracks; thin continuous clay films; roots common; mildly alkaline; clear wavy boundary.

Clca 19877 61 to 86 cm (24 to 34 inches). Reddish brown (2.5YR 4/4) clay; weak coarse prismatic structure parting to moderate fine angular blocks; very firm, plastic, sticky; many light reddish brown (5YR 6/3) soft lime segregations less than 10 mm in diameter; few hard lime concretions less than 2 mm in diameter; few dusky red (2.5YR 3/2) organic stains along large vertical structural cracks; thin continuous clay films; few sedge roots; strong effervescence; gradual irregular boundary.

C2ca 19878 86 to 122 cm (34 to 48 inches). Reddish brown (2.5YR 4/4) clay; moderate fine angular blocky structure; very firm, plastic, sticky; prominent slickensides with thick clay flows on pressure faces; many pinkish gray (5YR 6/2) soft lime segregations less than 10 mm in diameter; few dark reddish brown (5YR 2/2) mottles or organic spots less than 2 mm in diameter; some lime coatings with greenish gray (5G 5/1) colors occur on the slickenside faces; few sedge roots and old root channels; strong effervescence; clear wavy boundary.

C3 19879 122 to 152 cm (48 to 60 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse subangular blocky structure parting to moderate fine angular blocks; very firm, plastic, sticky; slickensides with thick clay films are prominent; greenish gray (5G 5/1) lime coatings occur on some of the slickenside faces; strong effervescence.

Remarks: This profile is in a very fine family. Sand content is low and clay content is high. At time of sampling a perched water table existed at the bottom of the B3 horizon and the entire solum above was saturated.

Soil temperatures:	Depth (inches)	Temperature
	20	11° C.
	30	10° C.
	40	10° C.

SOIL CLASSIFICATION-TERRIC BOROSAPRIST
LOAMY, MIXED, DYSIC
SERIES - - - - - BESEMAN

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SOIL NO - - - - - S74MI-67-1 COUNTY - - - LANGLADE

GENERAL METHODS- - - 1A, 1B1B, 2A1, 2B

SAMPLE NOS. 74L835-74L840

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -)RATIO														
		SAND	SILT	CLAY	FINE	CLAY	VCDS	CORS	MEDS	FNES	VFNS	QCSI	FNSI	VFSI	SAND	INTR
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY
		PCT LT 2MM - - - - -) PCT PCT CLAY														
000-010	011															
010-020	012															
020-051	0E1															
051-089	0E2															
089-104	2C1	8.2	84.6	7.2		.0	.3	1.2	2.3	4.4	40.6	44.0		3.8		.97
104-140	2C26	11.7	73.3	15.0		.0	.7	2.0	2.8	6.2	39.2	34.1		5.5		.88

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (BULK DENSITY) (- - - - -) WATER CONTENT - - - - -) CARBONATE (- - - - -) PH - - - - -)																	
	VTCL	(- - - - -) WEIGHT (- - - - -)					4A1D	4A1H	4D1	4B1C	4B1C	4B2A	4C1	6E1B	3A1A	8C1A	8C1E	
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/	2	.002	H2O	CACL
CM	PCT	PCT	(- - - - -)	PCT	LT	75	(- - - - -)	LT20	G/CC	G/CC	PCT	PCT	PCT	CM	PCT	PCT		
000-010	0	0	0	0	0	0								133				
010-020	0	0	0	0	0	0								112			3.4	2.8
020-051	TR	0	0	0	0	TR	TR	.19	.47		441	372	122	.61			3.6	2.8
051-089	TR	0	0	0	0	TR	TR	.21	.56		538	475	111	.90			3.8	3.0
089-104	TR	0	0	0	0	TR	TR							7.0			4.1	3.7
104-140	TR	0	0	0	0	TR	TR							13.2			4.0	3.3

DEPTH	(ORGANIC MATTER)			IRCN	PHCS	(- -EXTRACTABLE BASES 5B4A- -)				ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)	
	6A1A	6B1A	C/N	6C2B	6N2E	6O2D	6P2B	6Q2B	6H1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1	
	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	8ACL	KCL	EXTB	NHAC	CA	SAT	EXTB	
	CARB			FE						EXTB	TEA	EXT	ACTY	TO	TO	NHAC	ACTY	
CM	PCT	PCT		PCT	PCT	-	-	-	-	-MEQ	/ 100	G-	-	-	-	-	-	PCT
000-010	53.7	1.10	49			9.1	3.5	.9	2.6	16.1	116		132	105		2.6	9	12
010-020	50.8	1.59	32			7.8	2.3	.2	.6	10.9	118		129	91.8		3.4	8	8
020-051	47.4	2.26	21			3.4	1.0	.1	.1	4.6	157		162	96.8		3.4	4	3
051-089	52.6	2.58	20			1.7	.5	.2	.0	2.4	160		162	104		3.4	2	1
089-104	1.60	.085	19			.2	.1	.1	.1	.5	22		22.5	12.8		2.0	2	2
104-140	.37	.025	15			1.6	.7	.1	TR	2.4	11.9		14.3	12.0		2.3	13	17

DEPTH	(SATURATED PASTE)			NA	NA	SALT	GYP	(- - - - -) SATURATION				EXTRACT		8A1-	(- - - - -) ATTERBERG			
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1
	REST	PM	H2C	ESP	SAR	TCYL	SOLU	EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	4F1
CM	CM		PCT	PCT		PPM	PCT	MMHOS/										4F2
000-010	7400	3.3	1020			650		.21	.2	.2	.2	.4	0	7.6	.2	.7	.0	4F2
010-020	9300	3.2	1020			330		.17	.2	.1	.1	.1	0	4.9	.0	.0	.0	4F2
020-051	8500	3.3	741			90		.12	.1	TR	TR	.0	0	2.7	.0	.1	.0	4F2
051-089	11000	3.8	878					.12	TR	.0	TR	.0	0	2.4	.2	.0	.0	4F2
089-104	70000	4.4	49					.04	TR	TR	.1	TR	0	2.1	.0	.7	.0	4F2
104-140	18000	3.7	43					.02	TR	TR	TR	.0	0	1.8	.0	.9	.0	4F2

DEPTH	(STATE OF DECOMPOSITION) PH (BULK DEN) COLE SUBS (- - - - -) WATER CONTENT - - - - -)															
	8F	8G	8H	8C1E	4A3A	4A1I	4D1	4B4	4B1C	4B2	4C1					
	MINL	(FIBER VOL)	PYROPHOSPHY	.01M	FILED	1/3B	RE-	RES-	FILED	1/3B	15-	WRD				
CM	PCT	PCT	PCT	(MUNS COLOR)	G/CC	G/CC	RENT	MET	STAT	RENT	BAR	CM/				
000-010		88	65	10YR 7/4	2.7							133				
010-020		64	43	7.5YR 6/4	2.9							83.9				
020-051	7	70	4	7.5YR 4/2	2.9	.18			93	503		72.7				
051-089	6	52	7	7.5YR 4/4	3.3	.16			84	508		68.1				
089-104												5.1				
104-140												7.7				

Soil classification: Terric Borosaprist; loamy, mixed, dysic.

Series: Beseman (sampled for Merwin but fiber content when rubbed was too low).

Pedon No.: S74WI-67-1.

Location: Langlade County, Wisconsin; SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 18, T. 33 N., R. 11 E.; 280 feet north of town road and 1,000 feet east of Hwy. B. About 45.2 deg. north latitude and about 89.0 deg. west longitude.

Climate: Humid continental. Mean annual temperature is 42.2° F; mean July temperature is 68.5° F; the mean January temperature is 13.8° F. Mean annual precipitation is 29.86 inches with nearly 2/3 of this during the growing season. Total annual snowfall is 48 inches. The frost-free season is 138 days at Antigo but less on the organic soil areas.

Parent material: Organic soil material derived primarily from grasses, reeds, and sedges over silty deposits of lacustrine or loess derivation.

Physiography: Shallow depression in a large glacial outwash plain; area is nearly level and local relief is less than 5 feet. Elevation is about 1,550 feet.

Vegetation: Overstory of black spruce and tamarack; understory of Labrador-tea, leatherleaf, cranberry, blueberry, sphagnum moss.

Size of area: Approximately 300 acres.

Microrelief: Low hummocks of 6 to 18 inches over entire area.

Subsidence: Slight; some areas appear to have been burned, leaving shallow pits less than 1 foot in depth.

Soil temperature: Measured soil temperature of 7.5° C. at 50 cm.

Described and sampled by: G.W. Hudelson, A.J. Klingelhoets, G.B. Lee, Warren Lynn, W.E. McKinzie, R. Newbury, and S. Payne on August 6, 1974. Samples were obtained from a pit dug with a spade.

Mat of living sphagnum with many live roots of ground cover species about 5 cm thick.
(Not sampled)

O11 74L835 0 to 10 cm. Dark brown (10YR 4/3) broken face fibric material, yellowish brown (10YR 5/4) rubbed, and very pale brown (10YR 7/3) pressed; fiber content about 80 percent undisturbed, 35 percent rubbed; matted structure; friable; sphagnum fiber with a small percent (less than 15 percent) of herbaceous material; many fine roots; less than 5 percent mineral material; pH 4.0 (Truog); clear smooth boundary.

O12 74L836 10 to 20 cm. Dark grayish brown (10YR 4/2) broken face, hemic material, very dark grayish brown (10YR 3/2) rubbed, and grayish brown (10YR 5/2) pressed; about 65 percent fibers undisturbed, about 25 percent rubbed; very weak coarse platy to matted structure; very friable; mixed herbaceous and moss fibers; many fine roots; about 15 percent mineral material; pH 4.2 (Truog); clear wavy boundary.

Oe1 74L837 20 to 51 cm. Very dark brown (10YR 2/2) broken face sapric material, dark brown (7.5YR 3/2) rubbed and pressed; about 70 percent fibers undisturbed, about 12 percent rubbed; weak fine and medium subangular blocky structure; very friable; dominantly herbaceous material; few sedge and shrub roots; about 25 percent mineral material; a 2-inch layer of woody material occurs at about 50 cm depth, wood fragments are dark brown (7.5YR 4/4) and appear to be dominantly tamarack and spruce remains; pH 4.2 (Truog); gradual wavy boundary.

Oe2 74L838 51 to 89 cm. Dark brown (7.5YR 3/2) broken face, rubbed and pressed sapric material; about 50 percent fibers, about 10 percent rubbed; weak fine and medium subangular blocky structure; very friable; dominantly herbaceous material with 25 percent mineral material; few sedge roots; pH 4.2 (Truog); clear wavy boundary.

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SAMPLE NOS. 72L838-72L842

(2) MICROWAVE PENETRATION RESISTANCE. A ROD 0.6 CM IN DIAMETER IS SLOWLY PUSHED INTO BULK DENSITY CLOD. ROUTINIZED AT

Soil classification: Typic Ochraqualf; coarse-loamy, mixed, frigid.

Soil: Cable taxadjunct*.

Soil No.: S72WI-21-4 (LSL Nos. 72L835-72L842).

Location: Forest County, Wisconsin; NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 32, T. 38 N., R. 12 E.; in Argonne Experimental Forest near State Highway 32.

Climate: Humid continental; mean annual temperature is about 40° to 45° F; mean annual precipitation is about 30 inches; and frost-free season is about 130 days.

Vegetation and land use: Native vegetation was primarily deciduous forests, with elm and ash predominating. Most of this soil is in forest. Small areas are used for pasture. When drained, small grain

Physiography: Depressional areas in glacial ground moraine.

Topography: Site is on a 1 percent slope in a depressional area.

Drainage: Poorly drained.

Ground water: Near the surface during wet seasons.

Erosion: Slight.

Permeability: Moderate.

Described by: Steve Payne and Robert Fox.

Sampled by: Robert H. Jordan and Robert L. Juve, September 18, 1972

(Colors are for moist soil unless otherwise stated)

01 72L835 15 to 0 cm (6 to 0 inches). Black (5YR 2/1) organic matter; many roots; the horizon is hemic to fibric in nature; strongly acid; abrupt boundary.

A2 72L836 0 to 26 cm (0 to 10 inches). Dark grayish brown (10YR 4/2) light sandy loam; weak medium subangular blocky structure; very friable; this horizon is a mixture of 10YR 4/2 and 10YR 3/2; roots common; few medium size gravel; thickness of the horizon ranges to about 32 cm in some places; strongly acid; clear wavy boundary.

B21g 72L837 26 to 40 cm (10 to 16 inches). Grayish brown (10YR 5/2) sandy loam with many coarse prominent mottles of strong brown (7.5YR 5/6); weak fine platy structure; firm, brittle, weakly cemented; few fine gravel; slightly acid; clear wavy boundary.

B22tg 72L838 40 to 59 cm (16 to 23 inches). Dark grayish brown (10YR 4/2) sandy loam with many fine faint mottles of brown (10YR 5/3); weak medium platy structure parting to weak fine subangular blocky structure; firm, brittle, weakly cemented; no roots; wide range of thickness of this horizon; neutral; clear wavy boundary.

B23tg 72L839 59 to 87 cm (23 to 35 inches). Dark grayish brown (10YR 4/2) heavy sandy loam with common medium faint mottles of brown (10YR 5/3) and distinct mottles of dark yellowish brown (10YR 4/4); weak medium subangular blocky structure; friable; neutral; gradual wavy boundary.

B3x 72L840 87 to 117 cm (35 to 47 inches). Dark gray (10YR 4/1) sandy loam with common fine prominent mottles of

SOIL CLASSIFICATION-TYPIC GLOSSOBORALF
FINE-SILTY,MIXED
SERIES - - - - -CAMPIA

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SOIL NO - - - - - S75W1-95-8 COUNTY - - - POLK

GENERAL METHODS - - -1A,1B1B,2A1,2B

SAMPLE NOS. 760225-760232

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B												INTR		FINE		NON-		RATIO	
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	II	CLAY	COS-	15-			
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	TO	CLAY			

000-020	AP	18.5	73.2	8.3	.7	.1	1.0	1.9	2.8	12.7	43.0	30.2	5.8	57.2	8			.87
020-028	A2	15.7	75.4	8.9	2.1	.1	.5	1.1	1.7	12.3	44.7	30.7	3.4	58.0	24			.37
028-036	A6B	14.5	65.5	20.0	8.4	.1	.3	.6	1.2	12.3	39.5	26.0	2.2	52.5	42			.40
036-061	B6A1	12.8	65.2	22.0	9.3	.1	.2	.3	1.1	11.1	40.2	25.0	1.7	52.0	42			.41
061-081	B6A2	12.8	67.7	19.5	8.6	.0	.1	.3	.9	11.5	43.3	24.4	1.3	55.4	44			.44
081-099	B3	14.1	66.3	19.6	8.6	.0	.1	.9	13.0	41.9	24.4		1.1	55.7	44			.44
099-119	C1	15.2	65.7	19.1	8.5	TR	.3	.6	1.4	12.9	39.3	26.4	2.3	53.1	45			.44
119-152	C2	13.1	67.6	19.3	8.7	.1	.3	.5	1.3	10.9	40.9	26.7	2.2	52.8	45			.43

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2												BULK DENSITY		WATER CONTENT		CARBONATE		PH	
		GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	4B1C	4B1C	4B2	4C1	6B1B	3A1A	8C1A	8C1E			
CM		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT			

000-020	0	0	0	0	92	0	1.36	1.41	.012		27.4	7.2	.27			6.7	6.1
020-028	0	0	0	0	95	0	1.65	1.66	.002		16.4	3.3	.22			6.6	6.2
028-036	0	0	0	0	96	0	1.60A					7.9				6.3	5.9
036-061	0	0	0	0	97	0	1.58	1.66	.017		22.0	9.0	.21			5.1	4.6
061-081	0	0	0	0	97	0	1.50	1.56	.013		22.0	8.6	.20			5.0	4.6
081-099	0	0	0	0	97	0	1.50A					8.6				5.1	4.6
099-119	TR	0	0	0	96	TR	1.50	1.57	.016		22.4	8.4	.21			5.2	4.6
119-152	0	0	0	0	96	0	1.50A					8.3				5.2	4.7

DEPTH	HORIZON	IRON		PHOS	EXTRACTABLE BASES				ACTY	AL	CAT EXCH		RATIO	RATIO	CA	BASE SAT	
		6A1A	6A1A		6C2B	6N2E	6O2D	6P2B			6Q2B	6H1A				6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1
CM		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT

000-020	1.91	.166	12		8.5	3.1	.1	.1	11.8	4.4		16.2	12.6	1.52	2.7	67	73	94
020-028	.23	.028	8		3.7	1.6	TR	TR	5.3	2.7		8.0	5.8	.65	2.3	64	66	91
028-036	.25	.037	7		7.2	2.5	.1	.2	10.0	5.1		15.1	11.4	.57	2.9	63	66	88
036-061	.21				7.2	2.4	.1	.2	9.9	8.0	.7	17.9	14.0	.64	3.0	51	55	71
061-081	.17				7.4	2.6	.1	.2	10.3	7.4	.7	17.7	14.4	.74	2.8	51	58	72
081-099	.17				7.7	2.8	.1	.2	10.8	7.6	.8	18.4	14.5	.74	2.8	53	59	74
099-119	.12				7.5	2.7	.1	.2	10.5	7.1	.7	17.6	14.0	.73	2.8	54	60	75
119-152	.12				8.2	2.7	.1	.2	11.2	6.5	.6	17.7	14.4	.75	3.0	57	63	78

DEPTH	HORIZON	SATURATED PASTE		NA	NA	SALT	GYP	SATURATION EXTRACT								ATTERBERG				
		8E1	8C1B					8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2
CM		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT

000-020																				
020-028																				
028-036																				
036-061																			338	128
061-081																				
081-099																				
099-119	5500	4.2	36.9					.14							.9				308	108
119-152																				

CLAY MINERALOGY (7A2C).

34-61 MT2 KK2 VR2 M11
61-81 MT2 KK2 VR1 M11
81-99 MT3 KK2 VR1 M11

RELATIVE AMOUNTS: (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.

MINERAL CODE: MT = MONTMORILLONITE MI = MICA KK = KADLINITE VR = VERMICULITE.

SAND MINERALOGY (7B1). PLACEMENT: MIXED.

036-61 VFNS - RE73 QZ71 FE2 TM ZR SP FD24 HN1 EP1 GM1 MS CL SO VR.

061-81 VFNS - RE76 QZ74 FE2 TM SP FD21 CL1 HN1 MS1 EP EN VR SO.

081-99 VFNS - RE79 QZ77 FE1 SP1 ZR FD18 HN1 CL1 EP1 GS MS VR GN.

RELATIVE AMOUNTS: AS PERCENT.

MINERAL CODE: CL = CHLORITE EP = EPIDOTE FD = FELDSPARS GS = GLASS HN = HORNBLende MS = MUSCOVITE

QUARTZ - QZ TALC - TC ZIRCON - ZR BASTASE - BA CECSTANT MINERALS - CE - TRON MINERALS - TR - CORNE - CO

Soil classification: Typic Glossoboralfs; fine-silty, mixed.

Soil: Campia.

Soil No: S75-WI-95-8.

Location: Polk County, Wisconsin; NE $\frac{1}{4}$, SW $\frac{1}{4}$, sec. 36, T. 34 N., R. 16 W.; 100 feet west of windbreak and 120 feet south of road. About 45°24' N. latitude and 92°10' W. longitude.

Climate: Humid continental; mean annual temperature is 43° F; mean July temperature is 71° F; mean January temperature is 11.8° F; mean annual precipitation is 27.5 inches with about two-thirds of this occurring during the growing season; mean annual snowfall is 41.2 inches; the growing season averages 127 days. (Data from Amery, WI., weather bureau substation.)

Vegetation and use: Native vegetation was primarily mixed northern hardwoods with some conifers. Most large areas of this soil have been cleared and are used for general farming. This site was in alfalfa hay meadow when sampled.

Parent material: Silty slack water deposits.

Physiography: Nearly level to sloping glacial lake basins.

Topography: Nearly level; site sampled was on a 2 percent plane slope.

Drainage: Well drained.

Ground water: Deep; over 5 feet.

Erosion: Slight.

Permeability: Moderate.

Described by: A.J. Klingelhoets and G. B. Lee, July 1975.

Ap 760225 0 to 20 cm (0 to 8 inches). Very dark grayish brown (10YR 3/2) silt loam; weak medium subangular blocky structure parting to moderate medium granular; friable; many roots; neutral; abrupt smooth boundary.

A2 760226 20 to 28 cm (8 to 11 inches). Brown (10YR 5/3) silt loam; moderate medium platy structure; friable; many roots; neutral; gradual irregular boundary.

A&B 760227 28 to 36 cm (11 to 14 inches). Grayish brown (10YR 5/2) silt (A2); moderate medium platy structure; friable; occupies about 55 percent of horizon as tongues 20 to 40 mm thick extending into or completely surrounding isolated remnants of dark yellowish brown (10YR 4/4) silt loam (B2t); moderate fine subangular blocky structure; friable; few thin patchy clay films on some faces of peds (B2t); many roots; slightly acid; gradual wavy boundary.

B&A1 760228 36 to 61 cm (14 to 24 inches). Dark brown heavy silt loam (B2t); moderate medium subangular blocky structure; firm; occupies about 70 percent of the horizon; thin patchy clay films on faces of peds (B2t); tongues of grayish brown (10YR 5/2) silt loam (A2) extend to bottom of horizon; weak coarse platy structure; friable; many roots; medium acid; gradual wavy boundary.

B&A2 760229 61 to 81 cm (24 to 32 inches). Dark brown (7.5YR 4/4) heavy silt loam (B2t); moderate medium subangular blocky structure; firm; occupies about 85 percent of the horizon; thin patchy clay films on faces of peds (B2t); tongues 10 to 20 mm thick of grayish brown (10YR 5/2) silt loam (A2) extend to bottom of horizon; friable; many roots; medium acid; gradual wavy boundary.

B3 760230 81 to 99 cm (32 to 39 inches). Dark brown (7.5YR 4/4) silt loam; weak coarse subangular blocky structure; friable; many roots; medium acid; gradual wavy boundary.

C1 760231 99 to 119 cm (39 to 47 inches). Dark yellowish brown (10YR 4/4) silt; many fine distinct grayish brown and yellowish brown (10YR 5/2 and 5/6) mottles; weak coarse platy structure; friable; weakly stratified; few alfalfa roots; medium acid.

C2 760232 119 to 152 cm (47 to 60 inches). Dark yellowish brown (10YR 4/4) silt; many fine distinct grayish brown and yellowish brown (10YR 5/2 and 5/6) mottles; few alfalfa roots; slightly acid.

Additional notes:

1. pH's in field determined by Truog kit.

SOIL CLASSIFICATION-TYPIC ARGIBOROLL
COARSE-LOAMY, MIXED
SERIES - - - - - CHETEK TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S75W1-95-9 COUNTY - - - POLK

GENERAL METHODS- - -1A, 1B1B, 2A1, 2B

SAMPLE NOS. 760233-760238

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO		
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	INTR	FINE	NON-	BDI
		2-	.05-	LT	LT	2-	1-	.5	.25	.10	.05	.02	.005	2-	.2-	TO	TO	CLAY	BAR
CM		.05	.002	.002	.0002	1									.10		CLAY		
		PCT LT 2MM															PCT	PCT	CLAY
000-017	AP	62.3	31.1	6.6	1.9	5.8	20.9	20.5	10.9	4.2	18.4	12.7			58.1	25.3	29		.59
022-042	B2T	67.8	20.3	11.9	5.3	6.6	27.0	21.2	10.4	2.6	11.5	8.8			65.2	17.0	45		.40
042-053	B3	85.2	9.4	5.4	1.8	8.7	37.5	25.7	11.2	2.1	9.7	3.7			83.1	10.5	33		.39
053-087	C1	88.2	7.0	4.8	1.5	7.3	36.9	27.8	13.7	2.5	4.1	2.9			85.7	10.3	31		.44
087-135	C2	92.9	4.6	2.5	1.0	9.2	42.8	28.5	10.8	1.6	2.6	2.0			91.3	6.3	40		
135-153	C3	97.1	1.8	1.1	.7	12.4	41.5	33.1	9.7	.4	1.1	.7			96.7	3.2	64		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	VOL.	WEIGHT	5-2	20-2	LT	20-2	1/3-	OVEN	COLE		4A1D	4A1H	401	481C	481C	482	4C1		6E1B	3A1A	8C1A	8C1E		
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE				1/10	1/3-	15-	WRO		LT	LT	1/1	1/2		
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	CM	PCT	PCT	PCT	PCT		
000-017	5	0	TR	2	2	39	4	1.65	1.70	.010				15.8	3.9	.19						6.3	6.0	
022-042	5	0	TR	4	5	31	9	1.70	1.77	.013				13.7	4.7	.15						6.5	6.0	
042-053	3	0	0	3	3	15	6	1.56A						7.0C	2.1	.08						6.6	5.9	
053-087	5	0	TR	4	3	12	7	1.56B						6.2C	2.1	.06						6.4	5.6	
087-135	5	0	TR	3	3	8	6	1.55A							1.5							5.8	5.0	
135-153	10	0	TR	7	6	3	14	1.55B						2.4C	1.2	.02						5.8	5.2	

DEPTH	ORGANIC MATTER		IRON	PHOS	EXTRACTABLE BASES 5B4A-				ACTY	AL	CAT EXCH		RATIO	RATIO	CA	BASE SAT	
	6A1A	6B1A	C/N	6C2C	6N2E	6O2D	6P2B	6Q2B	6H1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1
	ORGN	NITG		EXT	CA	MG	NA	K	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
CM	PCT	PCT		PCT	PCT	PCT	PCT	PCT	MEQ	EXTB	TEA	EXT	ACTY	TO	TO	PCT	PCT
000-017	1.00	.088	11			1.8	TR	.1	1.7			6.9	1.05				
022-042	.19	.020	10			5.2	2.3	TR	.1	7.6	2.5	10.1	8.2	.69	2.3	63	75
042-053	.10					2.6	1.0	.0	TR	3.6	1.6	5.2	3.9	.72	2.6	67	69
053-087	.09					2.4	1.0	.0	TR	3.4	1.6	5.0	3.8	.79	2.4	63	68
087-135	.07					1.9	.8	.0	TR	2.7	1.4	4.1	3.9	1.56	2.4	49	66
135-153	.05					1.6	.6	TR	TR	2.2	1.1	3.3	2.6	2.36	2.7	62	67

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	SATURATION EXTRACT 8A1-										ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2	
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST	
	OHM-					SOLU		MMHOS/										LMIT	INDX	
CM	CM		PCT	PCT		PPM	PCT	CM	(					MEQ / LITER				PCT	
000-017																				
022-042																		220	70	
042-053																				
053-087																				
087-135	31000	5.5	17.9					.08								.5				
135-153																				

CLAY MINERALOGY (7A2C).

22-42 MT3 KK2 VR1 MI1 QZ1
42-53 VR2 KK2 MT2 MI1
53-87 MT3 KK2 VR1

RELATIVE AMOUNTS: (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.
MINERAL CODE: MT = MONTMORILLONITE MI = MICA KK = KAOLINITE VR = VERMICULITE QZ = QUARTZ.

SAND MINERALOGY (7B1).

PLACEMENT: MIXED.

022-42 FNES - RE83 QZ77 FE4 TM1 SP1 PD12 MS4 PR1 AG.
042-53 FNES - RE81 QZ77 FE4 FD13 MS4 PR1 HN1.
053-87 FNES - RE86 QZ78 FE7 TM1 FD9 HN2 MS2 AU1.

RELATIVE AMOUNTS: AS PERCENT.

MINERAL CODE: FD = FELDSPARS HN = HORNBLende MS = MUSCOVITE PR = PYROXENE QZ = QUARTZ TM = TOURMALINE
RE = RESISTANT MINERALS FE = IRON MINERALS SP = SPHENE AG = ANTIORITE AU = AUGITE.

(A) ESTIMATED.

(B) CORE SAMPLES, METHOD 4A3A.

(C) SIEVED SAMPLE, METHOD 4B1A.

(D) LIQUID LIMIT AND PLASTIC INDEX BY USDA-SCS, SOIL MECHANICS LAB, LINCOLN, NE.

Soil classification: Typic Argiboroll; coarse loamy, mixed.

Soil: Chetek taxadjunct*.

Soil No.: S75WI-95-9.

Location: Ball County, Wisconsin; col NWL Sec 2 T 22 N R 17 W - 75 feet east of fence along gravel road

SOIL CLASSIFICATION-TYPIC UDIPSAMMENT
MIXED, FRIGID
SERIES - - - - -CROMWELL TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S75WI-95-3 COUNTY - - - POLK

GENERAL METHODS- - -1A,181B,2A1,2B

SAMPLE NOS. 760186-760195

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO			
		SAND			SILT			CLAY			FINE			NON-CLAY			801			
		2- .05	.05- .002	LT .002	LT .0002	VCOS 1	CORS .5	MEDS .25	FNES .10	VFNS .05	COSI .02	FNSI .002	VFSI .002	SAND .10	II .02	TO CLAY	CO3- CLAY	15- TO CLAY		
CM	PCT LT 2MM															PCT			PCT	CLAY
000-003	A1	60.7	30.1	9.2		6.0	18.6	18.5	14.4	3.2	10.7	19.4		57.5	19.2			2.3		
003-008	A2	75.1	19.5	5.4	2.8	11.4	23.0	20.9	15.8	4.0	7.1	12.4		71.1	17.1	52		.96		
008-023	B21	77.2	18.2	4.6		14.5	22.0	20.0	15.9	4.8	7.0	11.2		72.4	18.0			.70		
023-033	B22	75.4	20.4	4.2	1.5	6.0	16.3	21.9	23.0	8.2	9.0	11.4		67.2	27.3	36		.57		
033-053	B3	85.8	9.8	4.4	1.9	10.7	20.1	30.0	20.8	4.2	4.1	5.7		81.6	15.4	43		.61		
053-078	B3	95.2	2.1	2.7		1.7	15.6	42.2	33.4	2.3	1.1	1.0		92.9	13.4			.59		
078-100	C1	96.9	1.9	1.2	.8	1.9	17.0	43.1	30.5	4.4	1.4	.5		92.5	15.9	67				
100-125	C2	96.9	1.8	1.3		17.9	33.9	23.9	18.8	2.4	1.0	.8		94.5	10.1					
125-178	C3	99.0	.6	.4		.1	3.9	34.7	56.4	3.9	.5	.1		95.1	22.1					
000-018	AP (A)	74.0	21.2	4.8		4.4	14.7	19.3	27.4	8.2	8.6	12.6		65.8	29.4			1.3		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2)										BULK DENSITY				WATER CONTENT				CARBONATE				(PH)	
	VOL. (%)					WEIGHT (%)					4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E			
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E			
CM	2	75				.074	PCT	BAR	DRY	8AR	8AR	8AR	8AR	8AR	8AR	8AR	CM/	2	.002	H2O	CACL			
	PCT	PCT	(--	--	PCT	LT	75	--	)	LT20	G/CC	G/CC		PCT	PCT	PCT	CM	PCT	PCT				
000-003	1	0	0		TR	2	40	2	1.3	8			40.3D			21.0	.25			5.4	5.1			
003-008	3	0	0		2	4	25	6	1.3	8			14.3D			5.2	.12			5.4	5.1			
008-023	10	TR	15	1	3	24	5	1.33C					14.0D			3.2	.14			4.6	4.3			

053-078	1	0	0	1	1	5	2	1.6	8					3.6D		1.6	.03			5.7	5.5
078-100	1	0	0	1	1	5	2	1.58C						2.8D		1.2	.03			6.0	5.5
100-125	15	0	TR	7	12	3	19	1.62C								1.5				6.0	5.6
125-178	TR	0	0	0	TR	2	TR	1.51C						1.8D		.8	.02			5.9	5.4
000-018	5	0	0	4	4	28	8									6.3				6.1	5.7

DEPTH CM	ORGANIC MATTER			IRON C/N	PHOS 6C2B EXT FE	EXTRACTABLE BASES 5B4A-				ACTY 6H1A BACL EXTB TEA	AL 6G1E KCL EXT ACTY	CAT EXCH		RATIO 801 NHAC CA	RATIO 803 NHAC CA	CA 5F1 SAT NHAC	BASE SAT		
	6A1A ORGN CARB	6B1A NITG	6C1N PCT			6N2E CA	6O2D MG	6P2B NA	6Q2B K			5A3A EXTB	5A6A NHAC				5C3 EXTB	5C1 NHAC	5C1 PCT
000-003	10.10	.525	19			20.7	3.3	TR	.6	24.6	23.6	TR	48.2	35.6	3.87	6.3	58	51	69
003-008	1.43	.084	17			5.3	.9	.0	.1	6.3	7.6	TR	13.9	10.0	1.85	5.9	53	45	63
008-023	.48	.033	15			.8	.3	.0	.1	1.2	7.0	1.5	8.2	5.9	1.28	2.7	14	15	20
023-033	.29					1.4	.4	.0	.1	1.9	4.7	.7	6.6	4.8	1.14	3.5	29	29	40
033-053	.15					1.6	.8	TR	.1	2.5	4.3	.5	6.8	5.0	1.14	2.0	32	37	50
053-078	.01					1.6	.6	.0	.1	2.3	1.8		4.1	2.8	1.04	2.7	57	56	82
078-100	.01					1.4	.4	.0	TR	1.8	1.6		3.4	2.2	1.83	3.5	64	53	82
100-125	.04					1.7	.4	.0	TR	2.1	1.9		4.0	2.6	2.00	4.3	65	53	81
125-178	.02					1.1	.3	.0	TR	1.4	.8		2.2	1.6	4.00	3.7	69	64	88
000-018	2.14	.161				6.5	2.1	.0	.3	8.9	5.7		14.6	11.6	2.42	3.1	56	61	77

DEPTH	(SATURATED PASTE)			NA	NA	SALT	GYP	SATURATION EXTRACT 8A1-										ATTERBERG	
	8E1	8C1B	8A	S02	SE	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST
	OHM-					SOLU		MMHOS/										LMIT	INX
CM	CM		PCT	PCT		PPM	PCT	CM	(	-	-	-	-	MEQ / LITER	-	-	-	-	PCT

000-003																			
003-008																			
008-023																			
023-033																			
033-053																			
053-078																			
078-100																			
100-125	34000	6.2	19.7					.10								.6			
125-178																			
000-018																			

CLAY MINERALOGY (7A2C).

8-23 VR3 KK2 M11 QZ1

33-53 VR3 KK2 QZ1

100-125 VR2 KK1 M11

RELATIVE AMOUNTS: (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.

MINERAL CODE: MI = MICA KK = KAOLINITE VR = VERMICULITE QZ = QUARTZ.

SAND MINERALOGY (7B1).

PLACEMENT: MIXED.

008-23 VFNS - RE82 QZ79 FE2 SP1 FD14 HN2 GN1 MS1 VR EP. FNES - RE77 QZ74 FE3 FD17 MS2 HN2 BT1 TE1.

033-53 VFNS - RE79 QZ67 FE4 ZR SP FD27 HN1 MS1 VR EN. FNES - RE80 QZ71 FE6 SP2 TM1 FD14 HN2 VR1

100-125 VFNS - RE79 QZ69 FE8 TM1 SP1 ZR FD19 HN1 GN1 AU MS VR. FNES - RE76 QZ70 FE6 SP FD19 HN2

Soil classification: Typic Udipsamment; mixed, frigid.

Soil: Cromwell taxadjunct*.

Soil No.: S75WI-95-3.

Location: Polk County, Wisconsin; SE $\frac{1}{4}$, Sec. 11, T. 36 N., R. 16 W.; 1,600 feet north and 3,600 feet east of south-

ture is 11.8° F; mean annual precipitation is 27.5 inches with about two-thirds of this occurring during the growing season; mean annual snowfall is 41.2 inches; the growing season averages 127 days. (Data from Amery, WI., weather bureau substation.)

Vegetation and use: Native vegetation was primarily pine with pioneer species of hardwood. Some of the less sloping areas have been cleared and are used for general farming. This site has a mature stand of red and white pine with an understory of hazelnut, fern, and forbs.

Parent material: Thin loamy outwash and acid stratified sand and gravel.

Physiography: Nearly level to sloping glacial outwash plains, terminal and recessional moraines, and highly pitted outwash.

Topography: Gently sloping with sample site on 5 percent plane slope.

Drainage: Somewhat excessively drained.

Ground water: Deep.

Erosion: None

Permeability: Moderately rapid in sola and rapid in substratum.

Described by: A.J. Klingelhoets and G.B. Lee, July 1975.

(Colors are for moist soil unless otherwise stated)

A1 760186 0 to 3 cm (0 to 1 inch). Black (10YR 2/1) sandy loam with moderate medium granular structure; very friable; very high in organic matter; estimated less than 5 percent by volume coarse fragments over 2 mm in diameter; many roots; medium acid; abrupt wavy boundary.

A2 760187 3 to 8 cm (1 to 3 inches). Dark brown (7.5YR 4/2) sandy loam; weak coarse platy structure; very friable; estimated less than 5 percent by volume coarse fragments over 2 mm in diameter; many roots; medium acid;

SOIL CLASSIFICATION-GLOSSIC EUTROBORALF

FINE-LOAMY, MIXED
CUSHING TAXADJUNCTU. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S75M1-95-2 COUNTY - - - POLK

GENERAL METHODS - - - 1A, 1B1B, 2A1, 2B

SAMPLE NOS. 760178-760185

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO			
		(- - - - - FINE (- - - - - SAND - - - - - SILT - - - - -) (- - - - -)														FINE NON-SD1			
		SAND	SILT	CLAY	FINE	VCOS	CORS	HEDS	FNES	VPNS	COSI	FNSI	VFSI	SAND	INTR	FINE	NON-	SD1	
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY	CO3-	15-
CH		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	TO	BAR	
		PCT LT 2MM														PCT	PCT	CLAY	
000-023	AP	59.4	34.2	6.4	1.3	2.7	7.5	11.6	23.0	14.6	19.4	14.8		44.8	45.5	20		.56	
023-033	A2	58.7	24.3	17.0	6.9	3.2	8.1	12.7	22.4	12.3	11.7	12.6		46.4	35.4	41		.44	
033-052	A&B	58.2	22.0	19.8	9.2	3.9	9.6	12.7	21.3	10.7	10.0	12.0		47.5	31.4	46		.49	
052-079	B&A	57.3	22.8	19.9	9.1	3.1	8.6	12.5	21.9	11.2	10.5	12.3		46.1	32.8	46		.46	
079-105	B&A	56.3	23.4	20.3	9.4	4.3	9.9	12.0	19.7	10.4	9.7	13.7		45.9	30.1	46		.54	
105-126	B&S	55.6	23.9	20.5	9.6	4.0	9.3	12.1	19.9	10.3	9.8	14.1		45.3	30.2	47		.53	
126-158	C1	52.8	26.2	21.0	9.2	3.1	8.2	11.2	19.6	10.7	10.5	15.7		42.1	31.2	44		.53	
158-198	C2	58.2	24.1	17.7		5.0	9.5	13.0	19.6	11.1	10.0	14.1		47.1	30.8			.52	

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2														BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	VOL. (- - - - - WEIGHT - - - - -)														4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E			
	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVER	COLL	1/10	1/3-	15-	WRD															
	2	75			.074	PCT	BAR	DRY		BAR	BAR	BAR	CH/															
CH	PCT	PCT	(- - -	PCT	LT	75	- - -)	LT20	G/CC	G/CC	PCT	PCT	PCT	CM														
000-023	5	0	TR	2	3	47	5	1.67	1.72	.009		14.3	3.6	.17						6.1	5.9							
023-033	5	0	TR	3	6	44	8	1.64	1.76	.023		16.1	7.5	.13						6.2	5.9							
033-052	4	0	0	1	5	45	6	1.61	1.76	.029		17.5	9.7	.12						5.8	5.3							
052-079	5	0	TR	1	5	46	6	1.63	1.73	.019		18.1	9.2	.14						5.3	4.7							
079-105	5	0	0	2	6	46	8	1.57	1.70	.026		21.6	10.9	.16						5.3	4.7							
105-126	5	0	TR	2	6	46	8	1.58	1.73	.029		21.2	10.8	.16						5.9	5.6							
126-158	5	0	TR	2	8	48	9	1.48	1.60	.025		24.7	11.2	.19						6.4	6.0							
158-198	5	0	TR	2	7	44	9	1.55	1.64	.018		20.3	9.2	.16						7.1	6.8							

DEPTH	ORGANIC MATTER				IRON PHOS				EXTRACTABLE BASES 5B4A				ACTY	AL	(CAT EXCH)	RATIO	RATIO	CA	(BASE SAT)
	6A1A	6B1A	C/N	6C2B	6H2E	6O2D	6P2B	6Q2B	6H1A	6G1E	5A3A	5A6A	8D1	8D3	5P1	5C3	5C1		
	ORGW	NITG		EXT	TOTL	CA	EG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
CH	CH	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-023	.75	.075	10		4.4	1.4	TR	.1	5.9	3.0			8.9	6.4	1.00	3.1	69	66	92
023-033	.21	.032	7		7.6	3.0	.1	.2	10.9	3.3			14.2	11.8	.69	2.5	64	77	92
033-052	.16	.030	5		8.3	3.8	.1	.3	12.5	4.9			17.4	13.7	.69	2.2	61	72	91
052-079	.12				7.6	4.1	.1	.3	12.1	5.5			17.6	14.2	.71	1.9	54	69	85
079-105	.10				8.1	4.5	.2	.3	13.1	4.7			17.8	15.1	.74	1.8	54	74	87
105-126	.07				9.7	5.5	.2	.3	15.7	3.3			19.0	16.2	.79	1.8	60	83	97
126-158	.05				10.0	5.6	.2	.2	16.0	2.9			18.9	16.3	.78	1.8	61	85	98
158-198	.05					5.2	.2	.2		1.6				13.9	.79				

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	SATURATION EXTRACT 8A1-										ATTERBERG	
	8E1	8C1B	8A	SD2	SE	SD5	6P1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4P1	4P2	
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	EG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST	
	OHM-					SOLU		MMHOS/										LMHT	INDX	
CM	CM	PCT	PCT			PPM	PCT	CM	NEQ / LITER										PCT	

000-023																				
023-033																				
033-052																				
052-079																		37A	17A	
079-105	4200	4.8	34.8					.15								2.9				
105-126																				
126-158																		31A	14A	
158-198																				

CLAY MINERALOGY (7A2C)

33-52 HT5 KK2 H12 VR1

79-105 HT5 KK2

105-126 HT5 KK2 H11 QZ1

COMMENTS: HIGH CHARGE MONTMORILLONITE DOES NOT EXPAND FULLY WITH GLYCOL

RELATIVE AMOUNTS: (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.

MINERAL CODE: HT = MONTMORILLONITE MI = MICA KK = KAOLINITE VR = VERMICULITE QZ = QUARTZ

SAND MINERALOGY (7B1)

PLACEMENT: MIXED.

SAND MINERALOGY (7B1) 0278 RE1 RE2 RE3 RE4 RE5 RE6 RE7 RE8 RE9 RE10 RE11 RE12 RE13 RE14 RE15 RE16 RE17 RE18 RE19 RE20 RE21 RE22 RE23 RE24 RE25 RE26 RE27 RE28 RE29 RE30 RE31 RE32 RE33 RE34 RE35 RE36 RE37 RE38 RE39 RE40 RE41 RE42 RE43 RE44 RE45 RE46 RE47 RE48 RE49 RE50 RE51 RE52 RE53 RE54 RE55 RE56 RE57 RE58 RE59 RE60 RE61 RE62 RE63 RE64 RE65 RE66 RE67 RE68 RE69 RE70 RE71 RE72 RE73 RE74 RE75 RE76 RE77 RE78 RE79 RE80 RE81 RE82 RE83 RE84 RE85 RE86 RE87 RE88 RE89 RE90 RE91 RE92 RE93 RE94 RE95 RE96 RE97 RE98 RE99 RE100

Soil classification: Glossic Eutroboralfs; fine-loamy, mixed.

Soil: Cushing taxadjunct*.

Soil No.: S75WI-95-2.

Location: Polk County, Wisconsin; NW¹/₄, Sec. 25, T. 36 N., R. 16 W.; 280 feet east of road and 350 feet south of large drainageway. About 45°35' N. latitude and 92°40' W. longitude.

Climate: Humid continental; mean annual temperature is 43° F; mean July temperature is 71° F; mean January temperature is 11.8° F; mean annual precipitation is 27.5 inches with about two-thirds of this occurring during the growing season; mean annual snowfall is 41.2 inches; the growing season averages 127 days (data from Amery, WI., weather bureau substation.)

Vegetation and land use: Native vegetation was principally mixed northern hardwood forest; much of this soil has been cleared and is used for general farming; present crop on this field is red clover.

Parent material: Loamy glacial till.

Physiography: Gently sloping to moderately steep glacial end and ground moraines.

Topography: Gently sloping with sample site on a 3 percent convex slope.

Drainage: Well and moderately well drained.

Ground water: Deep - over 5 feet at time of sampling.

Erosion: Slightly eroded.

Permeability: Moderately permeable.

Described by: A.J. Klingelhoets and G. B. Lee, July 1975.

(Colors are for moist soil unless otherwise stated)

Ap 760178 to 23 cm (0 to 9 inches). Dark grayish brown (10YR 4/2) light loam; weak medium subangular blocky structure parting to weak fine granular; friable; estimated 5 percent by volume coarse fragments over 2 mm and less than 1 percent over 3 inches in diameter; many roots; medium acid; abrupt wavy boundary.

A2 760179 23 to 33 cm (9 to 13 inches). Brown (10YR 5/3) sandy loam; moderate coarse platy structure; friable; estimated 5 percent by volume coarse fragments over 2 mm and less than 1 percent over 3 inches in diameter; many roots; slightly acid; gradual wavy boundary.

A&B 760180 33 to 52 cm (13 to 20 inches). Grayish brown (10YR 5/2) sandy loam (A2); weak coarse platy structure; friable; occupies about 60 percent of the horizon as tongues 10 to 30 mm thick extending into or completely surrounding remnants of dark brown (7.5YR 4/4) loam (B2t); moderate medium subangular blocky structure; friable; few thin patchy clay films on faces of peds (B2t); estimated less than 5 percent by volume coarse fragments greater than 2 mm in diameter; many roots; slightly acid; gradual irregular boundary.

B&A 760181 52 to 79 cm (20 to 31 inches). Dark brown (7.5YR 4/4) clay loam (B2t); weak coarse prismatic structure parting to moderate medium subangular blocky; firm; occupies about 75 percent of the horizon; thin patchy clay films on more than 50 percent of surfaces of peds; tongues of brown (7.5YR 5/2) sandy loam (A2) extend to bottom of horizon; weak coarse platy structure; friable; estimated less than 5 percent by volume coarse fragments greater than 2 mm in diameter; many roots; medium acid; clear wavy boundary.

B&A 760182 79 to 105 cm (31 to 41 inches). Dark brown (7.5YR 4/4) clay loam (B2t); few fine distinct mottles of strong brown (7.5YR 5/6); weak coarse prismatic structure parting to moderate medium subangular blocky; firm; occupies about 75 percent of the horizon; thin patchy clay films on more than 50 percent of surfaces of peds; tongues of brown (7.5YR 5/2) sandy loam (A2) extend to bottom of horizon; weak coarse platy structure; friable.

estimated less than 5 percent by volume coarse fragments greater than 2 mm in diameter; many roots; medium acid; clear wavy boundary; separated on depth for analysis only.

Bg 760183 105 to 126 cm (41 to 49 inches). Dark brown (7.5YR 4/4) loam; many fine distinct strong brown, brown, and yellowish red (7.5YR 5/6, 5/2, and 5YR 5/6) mottles; moderate medium subangular blocky structure; friable;

SOIL CLASSIFICATION-TERRIC BOROSAPRIST

LOAMY, MIXED, EUTIC
SERIES - - - - -DAWSON TAXADJUNCTU. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S74WI-85-2 COUNTY - - - ONEIDA

GENERAL METHODS - - -1A, 1B1B, 2A1, 2B

SAMPLE NOS. 74L900-74L904

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -) RATIO														
		SAND	SILT	CLAY	FINE	VCOS	CORS	HEDS	PHES	VFNS	COSI	PHSI	VPSI	SAND	INTB	FINE
		2-	.05-	LT	CLAY	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY
CH		PCT LT 2MM - - - - -) PCT PCT CLAY														
000-015	OE1															
020-050	OA2															
050-090	OA3															
090-120	OA4															
120-150	CG	73.8	21.7	4.5		.6	18.9	33.1	17.4	3.8	15.6	6.1		70.0		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (BULK DENSITY) (- - - - -) WATER CONTENT - - -) CARBONATE (- - - - -)										(- - - - -)					
VOL. (- - - - -)		WEIGHT (- - - - -)				4A1D 4A1H 4D1		4B1C	4B1C	4B2A	4C1	6B1B	3A1A	8C1A	8C1E	
GT	GT	75-20	20-5	5-2	LT	20-2	1/3- OVER	COLE	1/10	1/3- 15-	WRD	LT	LT	1/1	1/2	
2	75				.074	PCT	BAR	DRY	BAR	BAR	BAR	CH/	2	.002	H2O	CACL
CH	PCT	PCT	(- - - PCT	LT 75	- - -)	LT20	G/CC	G/CC	PCT	PCT	PCT	PCT	CH	PCT	PCT	
000-015	0	0	0	0	0	0	.09	.25	727	556	104	.56			5.3	4.6
020-050	0	0	0	0	0	0	.25	.88	348	334	115	.58			5.4	4.8
050-090	0	0	0	0	0	0	.14	.47	625	620	137	.68			5.4	4.9
090-120	0	0	0	0	0	0	.21	.66	435	405	106	.69			5.4	5.0
120-150	1	0	0	TR	1	1						3.3			5.0	4.8

DEPTH (ORGANIC MATTER)		IRON	PHOS	(- - -EXTRACTABLE BASES 5B4A- - -)				ACTY	AL	(CAT EICH)		RATIO	RATIO	CA	(BASE SAT)	
6A1A	6B1A	C/N	6C2B	6H2E	6O2D	6P2B	6Q2B	6H1A	6G1E	5A3A	5A6A	8D1	8D3	5P1	5C3	5C1
ORGW	WITG		EXT	TOTL	CA	HG	NA	K	SUM	BACL	KCL	EXTB	NHAC	CA	SAT	EXTB
CARB			FE						EXTB	TEA	EXT	ACTY		TO	NHAC	ACTY
PCT	PCT		PCT	PCT	(- - - - -	- - - - -	- - - - -	- - - - -	/ 100	G- - - - -	- - - - -	- - - - -	- - - - -	CLAY	HG	PCT
CH																
000-015	44.2	2.51	18		52.1	12.6	.3	1.0	66.0	104		170	111		4.1	47
020-050	44.0	2.54	17		61.6	13.6	.3	.2	75.7	105		180	113		4.5	55
050-090	45.9	2.44	19		65.0	17.2	.3	.3	82.8	107		189	107		3.8	61
090-120	35.1	1.82	19		57.4	15.8	.2	.1	73.5	87.9		161	93.9		3.6	61
120-150	.42															

DEPTH	(SATURATED PASTE)										SATURATION EXTRACT 8A1-										ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6P1A	8A1A	6H1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2			
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	CO3	CL	SO4	NO3	LIQD	PLST			
	OHM-					SOLU	PPH	HNHOS/										LNIT	INDX			
CM	CM	PCT	PCT			PCT	CM	(			MBQ	/	LITER					PCT	
000-015	6200	5.3	698			800		.22	.9	.5	.2	.2	0	.3	.2	.8	.0					
020-050	7700	5.5	592			380		.11	.6	.3	.1	TR	0	.0	.2	.9	.0					
050-090	6300	5.3	935			1000		.19	1.0	.6	.1	TR	0	.3	.0	1.5	.8					
090-120	4800	5.3	797			1200		.26	1.4	.8	.1	TR	0	.3	.2	1.8	.0					
120-150																						

DEPTH	HISTOSOL CHARACTERIZATION														
	(STATE OF DECOMPOSITION)					PH	(BULK DEN)	COLE	SUBS	WATER CONTENT					
	8F	8G	8H	8C1E	4A3A	4A1I	4D1		4B4	4B1C	4B2	4C1			
	MINI (FIBER VOL)	PYROPHOSPT	.01H	FILD	1/3B	RE-	RES-	FILD	1/3B	15-	WRD				
	CONT	UNRB	RUB	SOLUBILITY	CACL	STAT	RENT	NET	IDUE	STAT	RENT	BAR	CH/		
CH	PCT	PCT	PCT	(MUNS COLOR)		G/CC	G/CC		PCT	PCT	PCT	PCT	CH		
000-015		15 A	1	10 YR	2/2	6.8	.34	.14	.213	71	181	468	75.7	.55	
020-050								.30	.431	71 B		262	66.3	.59	
050-090	16	30	4	7.5YR	4/2	6.0	.18	.16	.432	84	450	498	69.5	.69	
090-120	16	30	8	7.5YR	4/2	6.0	.18	.28	.330	84	462	297	50.5	.69	
120-150	30	48	4	10 YR	6.5/3	5.7	.15			58	523		1.9		

(A) 50 PERCENT BLACK PARTICLES (CHARCOAL?).

(B) ESTIMATED.

Soil classification: Terric Borosaprists; loamy, mixed, euc.

Series: Dawson taxadjunct*.

Soil No.: S74WI-85-2.

Location: Oneida County, Wisconsin; NE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 32, T. 35 N., R. 11 E.; 100 feet west of stream and 75 feet north of road. About 45° 30' N. latitude and about 89° 14' W. longitude.

Climate: Humid continental. Mean annual temperature is 41.6° F; mean July temperature is 68.4° F; mean January temperature is 12.8° F; mean annual precipitation is 30.78 inches with nearly two-thirds of the precipitation falling during the growing season; total amount of snowfall is 55.6 inches; the growing season averages 127 days, but less in the organic areas (data from Rhinelander, WI., weather bureau substation).

Parent material: Deposits of herbaceous organic material 16 to 50 inches thick over sandy mineral deposits.

Physiography: Depressional area along drainageway.

Vegetation: Sedges, willow, tag alder, grasses, forbs, spirea.

Size of area: About 200 acres.

Distance to adjacent mineral soil: About 200 feet to the west.

Depth to water table: 75 cm.

Microrelief: Hummocky. Hummocks are 12 to 18 inches high.

Subsidence: None

Soil temperature: Measured soil temperature of 10.0° C. at 50 cm.

Described and sampled by: G.W. Hudelson, W.C. Lynn, W.E. McKinzie, C.B. Lee, R.L. Newbury, S.W. Payne, and A.J. Klingelhoets. Sampled from pit to 40 inches, posthole digger below 40 inches.

Oa1 74L900 0 to 15 cm. Very dark brown (7.5YR 2/2), dark brown (7.5YR 3/2) rubbed or pressed hemic material; about 80 percent fiber, about 35 percent rubbed; massive (matted); friable; fibers primarily herbaceous; about 15 percent mineral soil material; many fine roots; pH 6.0 (Truog); clear wavy boundary.

Oa1 (not sampled) 15 to 20 cm. Black (7.5YR 2/1) broken face, rubbed, or pressed sapric material; about 40 percent fiber, about 5-10 percent rubbed; weak fine subangular blocky structure; very friable; fibers primarily herbaceous; about 35 percent mineral soil material; common fine roots; pH 5.8 (Truog); clear wavy boundary.

Oa2 74L901 20 to 50 cm. Dark brown (7.5YR 3/2) broken face, rubbed, very dark brown (10YR 2/2) pressed sapric material; about 40 percent fiber, about 5-10 percent rubbed; weak medium and fine subangular blocky structure; friable; fibers primarily herbaceous; about 30 percent mineral soil material; few fine roots; pH 6.2 (Truog); gradual wavy boundary.

Oa3 74L902 50 to 90 cm. Very dark brown (10YR 2/2), very dark grayish brown (10YR 3/2) rubbed, very dark brown (7.5YR 2/2) pressed sapric material; about 60 percent fibers, about 15-20 percent rubbed; weak coarse platy structure; very friable; fibers primarily herbaceous with a few woody fragments; about 25 percent mineral soil material; few fine roots; pH 6.2 (Truog); gradual wavy boundary.

Oa4 74L903 90 to 120 cm. Very dark brown (10YR 2/2), very dark grayish brown (10YR 3/2) rubbed, very dark brown (7.5YR 2/2) pressed sapric material; about 35 percent fibers, about 10-15 percent rubbed; weak coarse platy structure parting to weak fine subangular blocky structure; very friable; fibers primarily herbaceous with a few woody fragments; about 25 percent mineral soil material; pH 6.2 (Truog); abrupt wavy boundary.

Cg 74L904 120 to 152 cm. Dark gray (5Y 4/1) medium and coarse sand; single grained; loose; pH 7.0 (Truog).

*This pedon is a taxadjunct to the Dawson series because it has more fine mineral material than is typically present in that series.

Remarks:

1. Oa3 and Oa4 sedge fibers are dark brown (7.5YR 3/3 and 3/4) and brown (7.5YR 5/4).
2. Cg horizon contains a few thin lenses (1 to 3 cm thick) of sandy-loam and loam.

SOIL CLASSIFICATION-AQUIC GLOSSOBORALF
FINE, MIXED
SERIES - - - - -DOLPH

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - STOWIS-71-3 COUNTY - - - WOOD

GENERAL METHODS- - -1A, 1B1B, 2A1, 2B

SAMPLE NOS. 70L935-70L942

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															FAML INTR FINE NON- 8D1			IRATIO	
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEOS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	II	CLAY	CO3-	15-			
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY	TO	CLAY	TO		
		PCT LT 2MM															PCT	PCT	PCT	CLAY	
000-20	AP	8.6	78.2	13.2	5.1	.6	2.0	1.6	1.6	2.8	37.4	40.8	7.8	5.8	40.9	39				.61	
020-26	A2	6.0	75.5	18.5	6.6	.2	.9	.9	.9	3.1	39.6	35.9	6.3	2.9	43.1	36				.48	
026-37	A6B	6.1	70.2	23.7	11.7	.4	.8	.8	.8	3.3	36.8	33.4	5.8	2.8	40.4	49				.46	
037-49	2B6A	16.9	48.0	35.1	22.9	1.6	4.5	3.6	3.4	3.8	24.5	23.5	4.9	13.1	29.9	65				.48	
049-65	2B21T	23.4	39.3	37.3	22.0	2.5	5.1	3.5	5.8	6.5	13.7	25.6	7.0	16.9	23.6	59				.50	
065-92	2B22T	21.4	39.2	39.4	19.7	1.2	2.9	3.0	6.2	8.1	14.3	26.9	7.1	13.3	26.1	50				.52	
092-146	2C	44.0	27.9	8.1	4.4	1.8	5.6	6.6	22.1	27.9	18.0	9.9	2.4	36.1	60.1	54				.95	
146-182	2CR	80.6	15.6	3.8	1.9	10.6	17.0	10.5	23.0	19.5	10.7	4.9	1.8	61.1	44.0	50				1.11	

DEPTH	PARTICLE SIZE ANALYSIS, MM, 38, 381, 382)										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	VOL. (-----WEIGHT-----)										4A10	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E			
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2						
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/	2	.002	H2O	CACL						
CM	PCT	PCT	(---PCT	LT	75	---	)	LT20	G/CC	G/CC	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	
000-20	TR	0	0	TR	TR	93	TR	1.40	1.46	.014	29.1	27.5	8.0	.28	3.58						5.0	4.5		
020-26	TR	0	0	TR	TR	96	TR	1.54	1.60	.013	25.1	23.9	8.9	.24	4.38						4.9	3.9		
026-37	TR	0	0	TR	TR	97	TR	1.46	1.53	.016	27.6	24.2	10.9	.20	2.38						4.7	3.8		
037-49	TR	0	0	TR	1	85	1	1.50A					16.7								4.5	3.7		
049-65	TR	0	0	1	TR	80	1	1.44	1.71	.058	28.0	26.2	18.8	.11	2.08						4.2	3.7		
065-92	TR	0	0	TR	TR	84	TR	1.44	1.71	.060	29.2	27.1	20.6	.10	1.48						4.6	3.9		
092-146	TR	0	0	2	1	51	3	1.60A					7.7								5.4	4.7		
146-182	12	0	0	11	7	25	18	1.70A					4.2								6.2	5.2		

DEPTH	ORGANIC MATTER			IRON	PHOS	EXTRACTABLE BASES 5B4A-				ACTY	AL	CAT EXCH		RATIO	RATIO	CA	BASE SAT								
	6A1A	6B1A	C/N			6C2B	TOTL	6N2E	6O2D			6P2B	6Q2B				5A3A	5A6A	BD1	BD3	5F1	5C3	5C1		
	ORGN	NIT6				EXT		CA	MG			NA	K				BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
	CARB					FE																TO	TO	ACTY	
CM	PCT	PCT		PCT	PCT	(--	--	--	--	SUM	GE	EXT	ACTY	TO	MG	PCT	PCT	PCT							
										/ 100															
000-20	1.60C	.151	11	1.1		5.6	2.5	0.2	0.2	8.5	9.1	0.3	17.6	13.9	1.05	2.2	40	48	61						
020-26	0.32	.036	9	0.9		3.5	2.8	0.2	0.3	6.8	10.0	3.5	16.8	13.6	0.74	1.3	26	40	50						
026-37	0.23	.028	8	1.0		3.8	4.5	0.3	0.4	9.0	13.2	5.2	22.2	17.5	0.74	0.8	22	41	51						
037-49	0.24	.030		0.7		5.7	8.4	0.3	0.7	15.1	15.6	6.4	30.7	25.6	0.73	0.7	22	50	59						
049-65	0.20	.017		3.3		5.8	9.1	0.3	0.7	15.9	14.4	3.4	30.3	25.3	0.68	0.6	23	52	63						
065-92	0.16			2.7		8.5	12.8	0.4	0.9	22.6	11.5	2.0	34.1	28.2	0.72	0.7	30	66	80						
092-146	0.07			1.3		6.8	6.7	0.4	0.3	14.2	5.2	0.5	19.4	16.0	1.98	1.0	43	73	89						
146-182	0.03			1.1		5.0	3.8	0.3	0.2	9.3	2.7		12.0	10.3	2.71	1.3	49	78	90						

DEPTH	(SATURATED PASTE)			NA	NA	SALT	GYP	SATURATION EXTRACT										8A1-		ATTERBERG	
	8E1	8C1B	8A	SD2	SE	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2		
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST		
	OHM-					SOLU		MMHOS/										LMIT	INDX		
CM	CM		PCT	PCT		PPM	PCT	CM	(					MEQ / LITER				PCT	
000-20																		330	7		
020-26																					
026-37																					
037-49																					
049-65																		520	28		
065-92																					
092-146	8000	5.2	35.4	3	1	20		0.11	0.1	0.2	0.5	TR									
146-182																					

(A) ESTIMATED.

(B) MICRO-PENETRATION RESISTANCE - A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 1/10- BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.

(C) ORGANIC MATTER IS 2 MG/M SO TO A DEPTH OF 1 M (4A1).

(D) DETERMINED BY SOIL MECHANICS LAB - SCS, LINCOLN, NE.

Soil classification: Aquic Glossoboralfs; fine, mixed.

Soil: Dolph.

Soil No.: STOWI-71-3.

Location: Wood County, Wisconsin; NW $\frac{1}{4}$, SE $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 23, T. 23 N., R. 5 E.; 525 feet north of road intersection.

Climate: Humid continental; mean annual temperature is about 43° F; mean annual precipitation is about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Original vegetation was deciduous forests consisting mainly of elm, oak, soft maple, and some white pine. Much of this land is in pasture or woodland. A few areas are being used

Parent material: Thin silty sediments over clay residuum from micaceous schist.

Physiography: Nearly level or depressional areas in rock-controlled upland.

Topography: Nearly level site with a 1 percent plane slope.

Drainage: Poorly drained.

Ground water: Deep

Erosion: None

Permeability: Slow

Described by: Paul H. Carroll

(Colors are for moist soil unless otherwise stated)

Ap 70L935 0 to 20 cm (0 to 8 inches). Dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure; friable; many fine fibrous roots; medium acid; abrupt smooth boundary.

A2 70L936 20 to 26 cm (8 to 10 inches). Grayish brown (10YR 5/2) silt loam with many fine prominent mottles of strong brown (7.5YR 5/6-5/8); weak thin platy structure; friable; many fine fibrous roots; strongly acid; clear wavy boundary.

A&B 70L937 26 to 37 cm (10 to 15 inches). Grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) silt loam (A2) with common fine prominent mottles of strong brown (7.5YR 5/6-5/8); weak medium prismatic structure parting to very weak fine subangular blocky structure; friable; isolated remnants of reddish brown (5YR 4/4) and yellowish red (5YR 4/6) heavy silt loam (Bt) occupy about 20 percent of the horizon; common fine fibrous roots; few thin clay films on faces of peds and in tubular pores of the Bt remnants; strongly acid; clear wavy boundary.

IIB&A 70L938 37 to 49 cm (15 to 19 inches). Reddish brown (5YR 4/4) and weak red (2.5YR 4/2) clay (Bt) with many fine distinct and prominent mottles of strong brown (7.5YR 5/6-5/8); moderate medium prismatic structure parting to weak fine angular blocky structure; firm; many thin dark brown (10YR 3/3) clay films on faces of peds and in tubular pores of the Bt portion of the horizon; tongues of reddish gray (5YR 5/2), brown (7.5YR 5/2) and light brownish gray (10YR 6/2) silt loam and silty clay loam (A2) penetrate this horizon from above and occupy approximately 20 percent of the horizon; few fine fibrous roots; strongly acid; clear wavy boundary.

IIB21t 70L939 49 to 65 cm (19 to 26 inches). Dark reddish brown (2.5YR 3/4) clay with few medium distinct mottles of yellowish red (5YR 5/6); moderate medium prismatic structure parting to moderate fine and very fine angular blocky structure; very firm; continuous thin clay films on faces of peds and in tubular pores; few (2 to 3 percent by volume) fine weathered rock fragments throughout horizon; very strongly acid; gradual wavy boundary.

IIB22t 70L940 65 to 92 cm (26 to 36 inches). Dark reddish brown (2.5YR 3/4) clay; weak medium prismatic structure parting to weak medium and fine angular blocky structure; very firm; common thin clay films on faces of peds and continuous flows in tubular pores; few (2 to 3 percent by volume) fine weathered rock fragments throughout horizon; very strongly acid; clear wavy boundary.

IIC 70L941 92 to 146 cm (36 to 57 inches). Variegated olive gray (5Y 4/2 and 5/2) and reddish brown (5YR and 2.5YR 4/4) very fine sandy loam; massive to weak coarse platy structure; friable; few moderately thick (2 to 4 inches) tongues of clay loam extend 10 to 12 inches into this horizon from the B2t horizon above; strongly acid; clear wavy boundary.

IICR 70L942 146 to 182 cm (57 to 71 inches). Dark olive gray (5Y 3/2) olive yellow (5Y 6/6) and strong brown (7.5YR 5/6) mica schist bedrock; moderately soft (can be chopped out with spade); thin clay coatings of light olive brown (2.5Y 5/4) on some schist fragments near upper boundary; slightly acid.

SOIL CLASSIFICATION-TYPIC GLOSSOBORALF
COARSE-LOAMY, MIXED
SERIES - - - - -EAUPLEINE

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S70WIS-37-1 COUNTY - - - MARATHON

GENERAL METHODS- - -1A, 1B18, 2A1, 2B

SAMPLE NOS. 70L862-70L869

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -) RATIO														
		SAND	SILT	CLAY	FINE	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	INTR	FINE
CM		2- .05	.05- .002	LT .002	CLAY LT .0002	1	1- .5	.5- .25	.25- .10	.10- .05	.05- .02	.02- .005	.005- .002	.002- .001	.01	NON- CO3-
		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	CLAY
000-22	AP	13.7	76.5	9.8	3.8	.6	1.5	3.3	4.0	4.3	37.5	39.0		9.4	43.3	39
022-30	A2	23.0	68.5	8.5	3.0	1.7	2.7	5.8	6.8	6.0	35.2	33.3		17.0	43.8	35
030-41	AEB	30.7	56.7	12.6	5.8	3.4	3.5	7.9	9.3	6.6	30.2	26.5		24.1	40.2	46
041-61	2B6A	41.3	46.1	12.6	6.8	4.6	5.3	7.9	12.7	10.8	22.8	23.3		30.5	39.8	54
061-97	2B2T	53.6	35.4	11.0	7.3	6.4	8.7	6.1	15.2	17.2	17.8	17.6		36.4	44.4	66
097-127	2B3T	55.4	35.3	9.3	5.6	7.5	8.2	5.0	15.2	19.5	17.9	17.4		35.9	47.2	60
127-177	2R	61.3	31.7	7.0	3.9	12.7	12.3	5.7	14.0	16.6	15.7	16.0		44.7	41.0	56
000-22	AP (A)															.50

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (BULK DENSITY) (- - - WATER CONTENT - - -) CARBONATE (- - PH - -)													
	VOL. (- - - - -)	WEIGHT (- - - - -)	4A1D	4A1M	401	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E	
CM	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN COLE	1/10	1/3-	15-	WRD	LT
	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-22	1	0	TR	1	1	88	2	1.41	1.46	.012	27.3	7.2	.29	6.0
022-30	1	0	0	1	1	79	2	1.64	1.66	.004	17.8	4.4	.22	6.0
030-41	2	0	TR	2	1	72	3	1.60	1.63	.006	16.3	6.0	.17	5.4
041-61	1	0	0	1	1	64	2	1.64	1.72	.016	19.4	18.2	5.7	4.7
061-97	3					57	0	1.75	1.85	.019	17.2	15.7	5.0	4.4
097-127	TR	0	TR	0	1	56	1	1.808				4.9		4.5
127-177	3	0	0	1	2	47	3	1.908				3.5		4.6
000-22	1	0	0	2	1	3						6.7		5.8

DEPTH	(ORGANIC MATTER)			IRON 6C2B EXT FE PCT	PHOS TOTL PCT	(--EXTRACTABLE BASES 5B4A--)					ACTY 6H1A BACL TEA G--	AL 6G1E KCL EXT	(CAT EXCH) 5A3A EXTB ACTY	RATIO 8D1 NHAC TO CLAY	RATIO 8D3 CA TO MG	CA 5F1 NHAC PCT	(BASE SAT)			
	6A1A ORGN CARB PCT	6B1A NITG PCT	C/N			6N2E CA	6O2D MG	6P2B NA	6O2B K SUM EXTB / 100	5C3 EXTB ACTY PCT							5C1 NHAC PCT			
CM	PCT	PCT		PCT	PCT	(--	--	--	--	--	--	--	--	--	--	PCT	PCT	PCT	PCT	
000-22	2.130	.187	11	0.9		8.3	1.7	0.1	0.1	10.2	8.0			18.2	13.8	1.41	4.9	60	56	74
022-30	0.37	.035	11	1.0		4.2	0.9	0.2	0.1	5.4	4.4			9.8	8.1	0.95	4.7	52	55	67
030-41	0.20	.032		1.2		5.4	1.1	0.2	0.2	6.9	5.7			12.6	11.0	0.87	4.9	49	55	63
041-61	0.15	.017		1.3		4.1	1.3	0.2	0.2	5.8	7.7			13.5	12.5	0.99	3.2	33	43	46
061-97	0.06			0.8		2.8	1.3	0.1	0.2	4.4	6.8			11.2	9.4	0.85	2.2	30	39	47
097-127	0.04			0.8		4.4	1.5	0.2	0.2	6.3	8.2			14.5	15.3	1.65	2.9	29	43	41
127-177	0.07			0.6		3.9	1.1	0.2	0.2	5.4	4.8			10.2	9.9	1.41	3.5	39	53	55
000-22	2.04	.176	12																	

DEPTH	(SATURATED PASTE)			NA	NA	SALT	GYP	(- - - - -) SATURATION EXTRACT 8A1- - - - -)										ATTERBERG		
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2	
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQID	PLST	
	OHM-					SOLU		MMHOS/										LMIT	INDX	
CM	CM		PCT	PCT		PPM	PCT	CM	(	-	-	-	-	-	-	-	-	PCT	
000-22																		34E	6	
022-30																				
030-41	5800	5.1	29.9	2	1	70		.44	2.4	0.6	0.7	0.1								
041-61																				
061-97																		24E	3	
097-127	8000	4.4	26.0	1	1	50		.41	1.5	0.7	0.9	0.1								
127-177																				
000-22																				

- (A) COMPOSITE OF SEVERAL SURFACE SAMPLES.
(B) ESTIMATED.
(C) MICRO-PENETRATION RESISTANCE - A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 1/10-BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.
(D) ORGANIC CARBON IS 8 KG/M SO TO A DEPTH OF 1 M (6A).
(E) DETERMINED BY SOIL MECHANICS LAB - SCS, LINCOLN, NE.

Soil classification: Typic Glossoboralfs; coarse-loamy, mixed.

Soil: Eau Claire.

Soil No.: S70WI-37-1

Location: Marathon County, Wisconsin; NE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 13, T. 26 N., R. 4 E.; 210 feet and 800 feet west of intersection of county road C and a town road.

Climate: Humid continental; mean annual temperature is about 43° F; mean annual precipitation is about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Original vegetation was mixed coniferous and deciduous forests. Much of this land has been cleared for general farming. Corn, small grains, and forages are the principal crops.

Parent material: Aeolian sediments over residuum from gneissic rocks high in mica.

Physiography: Rock-controlled uplands. Gently sloping to sloping relief.

Topography: Site is on a 3- to 4-percent plane slope with a northeast aspect.

Drainage: Well and moderately well drained.

Ground water: Deep.

Erosion: None to slight.

Permeability: Moderate.

Described by Paul H. Carroll.

(Colors are for moist soil unless otherwise noted)

Ap 70L862 0 to 22 cm (0 to 9 inches). Dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; many fine fibrous roots; neutral; clear smooth boundary.

A2 70L863 22 to 30 cm (9 to 12 inches). Brown (10YR 5/3) silt loam marginal to very fine sandy loam; weak fine platy structure; very friable; common fine fibrous roots; slightly acid; clear wavy boundary.

A&B 70L864 30 to 41 cm (12 to 16 inches). Brown (10YR 5/3) silt loam marginal to very fine sandy loam (A2); weak thin platy structure; very friable; occupies about 75 percent of the horizon and completely surrounds or tongues into remnants of Bt; dark yellowish brown (10YR 4/4) silt loam (Bt); weak fine subangular blocky structure; friable; common fine fibrous roots; very few thin clay films on faces of some peds in the Bt remnants and in some pores; medium acid; clear wavy boundary.

IIB&A 70L865 41 to 61 cm (16 to 24 inches). Dark yellowish brown (10YR 4/4) and dark brown (7.5YR 4/4) loam (Bt); weak medium subangular blocky structure; firm; occupies about 60 percent of the horizon and consists of upward extensions of the underlying Bt horizon; few thin clay films on faces of some peds and in tubular pores; tongues of brown (10YR 5/3) very fine sandy loam (A2) penetrate and completely surround Bt peds in the upper part; weak thin platy structure; very friable; few fine fibrous roots; approximately 1 percent by volume of fine rounded and sub-rounded pebbles derived from underlying micaceous rocks; strongly acid; clear wavy boundary.

IIB2t 70L866 61 to 97 cm (24 to 38 inches). Dark brown (7.5YR 4/4) loam; moderate medium and fine subangular blocky structure; friable; many thin dark brown (10YR 3/3) clay films in continuous tubular pores and on faces of peds; 2 to 5 percent by volume of subangular and angular pebbles derived from underlying micaceous rocks; strongly acid; gradual wavy boundary.

IIB3t 70L867 97 to 127 cm (38 to 50 inches). Dark brown (7.5YR 4/4) and strong brown (7.5YR 5/6) light loam; weak medium subangular blocky structure; friable; few thin dark brown (10YR 3/3) clay films on faces of peds and in pores throughout the upper and middle parts of the horizon but becoming thick and continuous on peds and in parts of the lower boundary; 10 to 15 percent by volume of angular and subangular pebbles derived from underlying micaceous rocks; strongly acid; clear wavy boundary.

IIR 70L868 127 to 177 cm (50 to 70 inches). Strong brown (7.5YR 5/6-5/8) and grayish brown (2.5Y 5/2) dominantly weakly indurated gneissic rocks high in mica with narrow (1-2") seams of loamy residuum between rocks; the loamy residuum diminishes in quantity with depth; thin continuous clay films on rock fragments at the upper boundary; loamy residuum is strongly acid.

Additional notes: Temperature readings following several days of cold (40° to 50° F) weather:

15 cm	10.5° C
50 cm	11.8° C
100 cm	13.2° C

SOIL CLASSIFICATION - EUTRIC GLOSSOBORALF
COARSE-LOAMY, MIXED
SERIES - - - - - EMMET TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE NRIS
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - S68W1-47-1 COUNTY - - - - - OCONTO

GENERAL METHODS - - - - - 1A, 1B1, 2A1, 2B

SAMPLE NOS. 68L1087-68L1097

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO		
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	FNES	COSI	FNSI	VFSI	TEXT	INTR	FINE	NON-	BDI	
CM		2-	0.05-	0.002	0.002	1	5	25	10	0.05	0.02	0.002	0.002	2-1	0.02	CLAY	CLAY	CLAY	
		0.05	0.002	0.002	0.002	1	5	25	10	0.05	0.02	0.002	0.002	2-1	0.02	CLAY	CLAY	CLAY	
000-10	A1	50.6	42.9	6.5	2.4	.5	4.1	10.7	22.7	12.6	24.5	18.4	38.0	49.3	37	7	.89		
010-20	A2	53.4	41.0	5.6		.8	4.3	11.4	23.8	13.1	23.9	17.1	40.3	49.7		6	.55		
020-36	BH1R	51.8	41.8	6.4	2.3	.6	3.4	9.3	23.2	15.3	24.8	17.0	36.5	53.2	36	6	.55		
036-46	A'2	63.1	31.8	5.1		1.5	5.8	13.8	28.2	13.8	17.0	14.8	49.3	45.7		5	.37		
046-61	B'2T	56.5	23.6	19.9	10.4	1.1	5.2	12.9	26.1	11.2	12.3	11.3	45.3	37.0	52	20	.39		
061-69	B'3	64.7	25.2	10.1		2.4	5.4	12.7	29.6	14.6	14.6	10.6	50.1	45.4		10	.37		
069-107	C1	65.4	26.6	8.0		3.8	6.1	12.9	29.1	13.5	15.0	11.6	51.9	44.3		8	.36		
107-135	C2	65.7	25.8	8.5	2.8	3.8	7.5	13.5	28.4	12.5	14.5	11.3	53.2	41.9	33	9	.39		
135-160	C3	64.7	27.3	8.0		2.6	5.7	11.8	29.4	15.2	15.9	11.4	49.5	47.3		8	.41		
160-180	C4	58.7	30.2	11.1		4.5	6.7	11.5	24.5	11.5	15.0	15.2	47.2	39.6		11	.39		
000-20	CA (A)	41.4	51.9	6.7		.5	1.9	5.7	17.3	16.0	33.1	18.8	25.4	59.7		7	.63		

DEPTH	HORIZON	BULK DENSITY, 11- - - - - WATER CONTENT, - - - - - CARBONATE (- - - - -)															RATIO		
		MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2	MM, 3B, 3B1, 3B2
CM		LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT
000-10	TR	0	0	TR	TR	56	TR	1.08	1.17	.028		35.3	5.8	.33			5.7	5.4	
010-20	TR	0	0	TR	TR	53	TR	1.408					3.1				6.1	5.4	
020-36	TR	0	0	TR	TR	56	TR	1.49	1.52	.007	16.1		3.5	.19			6.7	5.9	
036-46	2	0	0	1	42	2	1.64	1.65	.002	11.8			1.9	.16			6.8	5.9	
046-61	15	10	15	TR	TR	40	3	1.59	1.68	.016		15.7	7.8	.11		TR	0	7.4	6.7
061-69	20	5	10	10	5	30	14	1.708					3.7			16	TR	8.0	7.2
069-107	20	5	10	10	5	30	14	1.86	1.90	.005	13.5		2.9	.16		19	0	8.3	7.4
107-135	25	5	10	10	5	30	18	1.76	1.81	.007	16.1		3.3	.17		16	0	8.2	7.3
135-160	6	0	0	8	2	39	10	1.708					3.3			20	0	8.3	7.4
160-180	11	0	0	9	6	40	15	1.91	1.97	.009	14.9		4.3	.18		24	0	8.4	7.5
000-20	TR	0	0	TR	TR	68	TR	1.53	1.54	.002	22.2		4.2	.28					

DEPTH	HORIZON	EXTRACTABLE BASES 5B4A- - - - - ACTY															RATIO		
		6A1A	6B1A	6C1A	6D1A	6E1A	6F1A	6G1A	6H1A	6I1A	6J1A	6K1A	6L1A	6M1A	6N1A	6O1A	6P1A	6Q1A	6R1A
CM		ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY
000-10	2.80C	.177	16	9.4	9.1	2.0	0.1	0.1	11.3	8.2		19.5	12.9	2.00	4.6	71	58	88	
010-20	0.91	.063	14	0.5	4.5	0.9	TR	0.1	5.5	5.6		11.1	6.3	1.10	5.0	71	50	87	
020-36	0.61	.040	15	0.7	5.0	0.5	TR	0.1	5.6	6.2		11.8	6.0	0.94	10.0	83	47	93	
036-46	0.24	.018	13	0.6	2.5	0.3	TR	0.1	2.9	2.2		5.1	3.0	0.59	8.3	83	57	97	
046-61	0.43	.030	14	1.3	7.80	2.40	0.1	0.1	10.6				9.9	0.50					
061-69	0.20			0.6	3.70	1.30	0.1	0.2	5.3				4.5	0.45					
069-107	0.05			0.4	4.00	1.00	0.1	0.1	5.2				3.1	0.39					
107-135	0.09			0.5	3.00	1.20	0.1	0.1	4.4				3.6	0.42					
135-160	0.09			0.4	3.20	1.00	TR	0.1	4.3				3.2	0.40					
160-180	0.02			0.4	6.00	1.00	0.1	0.1	7.2				3.6	0.32					
000-20	1.50																		

DEPTH	HORIZON	SATURATION EXTRACT 8A1- - - - - ACTY															RATIO		
		8A1	8B1	8C1	8D1	8E1	8F1	8G1	8H1	8I1	8J1	8K1	8L1	8M1	8N1	8O1	8P1	8Q1	8R1
CM		ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY	ACTY
000-10																			
010-20																			
020-36																			
036-46																			
046-61																			
061-69																			
069-107	11000	8.1	26.1				50		0.29										
107-135																			
135-160																			
160-180																			
000-20																			

IDENTIFICATION OF THE SPODIC HORIZON BY LABORATORY CRITERIA. (E)																			
DEPTH	HORIZON	(PYROPHOSPHATE, PH10)	(CIT - DIT)	(PYROPHOSPH)	PYRJ	CEC	6C5A	6C5A	6A1B	6C2A	6C7A	FE+AL	AL+C	FE+AL	-1/2	CLAY	EXT	EXT	EXT
020-36	B1RH	.41	.23	.7	.10	138													

CLAY MINERALOGY (7A2C).

020-36 KKI M11 VRI.
046-61 M12 KKI VRI M11 M11 QZ1 FDI.
COMMENTS - BY INFERENCE, A CONSIDERABLE AMORPHOUS COMPONENT IS PRESENT. CLAY MINERALOGY IS MIXED.
RELATIVE AMOUNTS - (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.
MINERAL CODE - MT = MONTMORILLONITE MI = MICA KK = KADLONITE CL = CLORITE VR = VERMICULITE QZ = QUARTZ
FD = FELDSPAR.

- (A) SAMPLE COLLECTED FROM CORN FIELD NEAR 42-1.
(B) ESTIMATED.
(C) ORGANIC CARBON IS 7 KG PER SQ M TO A DEPTH OF 1 METER (METHOD 6A1).
(D) METHODS 6N4C FOR CA AND 6O4C FOR MG.
(E) BELTSVILLE SOIL SURVEY INVESTIGATIONS UNIT, USDA-SCS, BELTSVILLE, MD.

Soil classification: Eutric Glossoboralf; coarse-loamy, mixed.

Soil: Emmet taxadjunct¹/.

Soil No.: S68WI-42-1 2/.

Location: Oconto County, Wisconsin: SEk. SWk. Sec. 8. T. 27 N.. R. 19 E.: 140 feet north of road and 500 feet west

of east edge of woodlot.

Climate: Climate is continental. Mean annual temperature is about 43° F., mean annual precipitation ranges from 28 to 31 inches; and average frost-free season is 133 days.

Vegetation and land use: Native vegetation was mixed hardwood forest with sugar maple, beech, ash, aspen, and hemlock the principal species. A large part of this soil is cultivated with small grain, fruits, corn and forages being the main crops.

Parent material: Highly calcareous gravelly loam or sandy loam glacial till.

Physiography: Gently sloping to steep side slopes of drumlins and glacial till plains.

Topography: Undulating ground moraine. Site is on a 3 percent convex slope with a west aspect.

Drainage: Well and moderately well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: A. Klingelhoets, R. Fox, E. Link, Aug. 22, 1968.

(Colors are for moist soils unless otherwise stated)

O1 1-1/2 to 0 cm (1/2 to 0 inches). Mat of hardwood leaves, twigs, and stems with some grasses.

A1 68L1087 0 to 10 cm (0 to 4 inches). Very dark gray (10YR 3/1) fine sandy loam; moderate medium crumb structure; friable; many of the sand grains have been stripped of color; many roots; neutral; clear wavy boundary.

A2 68L1088 10 to 20 cm (4 to 8 inches). Grayish brown and dark grayish brown (10YR 5/2 and 4/2) fine sandy loam; weak coarse plates parting to weak fine subangular blocks; friable; much earthworm activity and mixing of A1 in holes and casts; roots common; slightly acid; clear wavy boundary.

B2hr 68L1089 20 to 36 cm (8 to 14 inches). Dark brown (7.5YR 4/4) fine sandy loam; weak fine and medium subangular blocky structure; friable; roots common; medium acid; abrupt irregular boundary.

A'2 68L1090 36 to 46 cm (14 to 18 inches). Brown (7.5YR 5/4) light sandy loam; moderate coarse platy structure; slightly hard and brittle when dry (weak fragipan); friable when moist; highly vesicular; few roots going down vertical structural breaks; slightly acid; abrupt irregular boundary.

B'2t 68L1091 46 to 61 cm (18 to 24 inches). Reddish brown (5YR 4/4) sandy clay loam; moderate medium subangular blocky structure; firm when moist; thin patchy clay films with dark reddish gray (5YR 4/2) color; 8 percent of volume is comprised of stones 3/4 to 3 inches in diameter and 5 percent of stones over 3 inches in diameter; roots common; neutral; clear wavy boundary. (5 to 9 inches thick.)

B'3 68L1092 61 to 69 cm (24 to 27 inches). Reddish brown (5YR 4/4) loam with spots and streaks of (5YR 5/4) especially in lower part of the horizon; weak medium subangular blocky structure; friable when moist; 8 percent of volume composed of stones 3/4 to 3 inches in diameter and 5 percent of stones larger than 3 inches in diameter; roots common; slight effervescence; gradual wavy boundary.

SOIL CLASSIFICATION- TYPIC EUTROBORALF; FINE-
LOAMY, MIXED
SERIES - - - - - EMMET TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE NR7SC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - S68W1-42-2 COUNTY - - - DCONTO

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 68L1098-68L1107

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO	
		SAND 2- .05	SILT .05- .002	CLAY LT .002	FINE CLAY LT .0002	VCOS 2- 1	CORS 1- .5	MEDS .5- .25	FVES .25- .10	VFNS .10- .05	COSI .05- .02	FNSI .02- .002	VFSI .005- .002	TEXT FAML 2-1	INTR II .02	FINE CLAY TJ	NON- CO3- CLAY	8D1 15- BAR
CM																		
000-5	A1	59.9	34.3	5.8	.3	3.8	11.1	31.7	13.0	16.7	17.6		46.9	47.9		6		
005-13	A2	65.1	31.0	3.9	.4	3.9	11.5	32.6	16.7	14.8	16.2		48.4	50.4		4	.62	
013-30	BH1R	66.9	26.8	6.3	1.5	5.2	13.3	31.0	15.9	11.7	15.1		51.0	43.9		6	.40	
030-41	A*2	63.9	30.2	5.9	1.3	5.3	13.9	29.6	13.8	15.2	15.0		50.1	44.7		6	.32	
041-58	B*2T	54.1	24.9	21.0	1.5	4.9	11.7	24.9	11.1	12.1	12.8		43.0	35.4		21	.37	
058-81	B*3T	54.1	28.9	17.0	1.9	5.0	11.0	24.1	12.1	15.3	13.6		42.3	40.0		16	.38	
081-99	C1	70.1	26.1	3.8	2.1	3.9	8.4	42.9	12.8	15.7	10.4		57.3	48.1		3	.34	
099-130	2C2	95.3	2.4	2.3	.8	1.1	6.5	84.1	2.8	2.1	.3		92.5	28.4		1	.30	
130-155	3C3	49.9	37.6	12.5	3.1	5.8	9.0	21.5	10.5	16.0	21.6		39.4	37.3		10	.38	
000-18	AP (A)																	

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (BULK DENSITY) (- - - - - WATER CONTENT - - - -) CARBONATE (- - PH - -)																		
	VOL. (- - - - -) WEIGHT (- - - - -) 4A1D 4A1H 401 481C 481C 482 4C1 6E1B 3A1A 8C1A 8C1E																		
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3- OVEN COLE	1/10	1/3- WRD									
	2	75				.074	PCT	BAR DRY	BAR	BAR	BAR	CM/							
CM	PCT	PCT	(- - -	PCT	LT 75 - - -)	LT20	G/CC	G/CC	PCT	PCT	PCT	CM				PCT	.002	H2O	CACL
006-5	0	0	0	0	0	46	0	1.108										6.4	6.0
000-13	1	0	0	1	1	42	2	1.308					2.4					6.5	5.7
013-30	10	5	10	TR	TR	35	2	1.45	1.46	.002	14.0		2.5	.15				6.7	5.9
030-41	10	5	10	TR	TR	40	3	1.52	1.53	.002	11.2		1.9	.13				6.7	5.8
041-58	10	5	10	TR	TR	45	2	1.50	1.60	.020			20.3	7.8	.17		TR	0	7.3
058-81	10	5	10	5	TR	45	8	1.45	1.58	.026			19.2	6.4	.17		5	1	7.6
081-99	15	5	5	5	5	30	11	1.91	1.94	.005	12.8		1.3	.19			28	1	8.4
099-130	0	0	17	4	4	21							.7				6	1	8.3
130-155	20	5	5	10	5	45	15	2.05	2.10	.007	11.5		4.7	.11			29	3	8.3
000-20	TR	0	0	TR	TR	TR	TR	1.31	1.42	.028			25.9	5.2	.28				

DEPTH	(ORGANIC MATTER)		IRON	PHOS	(- - - - - EXTRACTABLE BASES 5B4A- - -)					ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)	
	6A1A	6B1A	C/N	6C2A	6S1A	6N2E	6O2D	6P2A	6Q2A	6H1A	6G1D	5A3A	5A6A	8D1	8D3	5F	5C3	5C1
CM	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
006-5	2.80C			0.3		26.9	10.2	TR	0.4	37.5	9.4		46.9	33.7	5.80	2.6	80	80
000-13	1.27			0.5		4.2	1.9	TR	0.1	6.2	2.9		9.1	5.9	1.50	2.2	71	68
013-30	0.60			0.7		3.6	0.9	TR	0.1	4.6	2.8		7.4	4.6	0.73	4.0	78	100
030-41	0.27			0.7		2.5	0.5	TR	0.1	3.1	1.9		5.0	3.2	0.54	5.0	78	97
041-58	0.42			1.5		7.8D	2.1D	0.1	0.2	10.2				10.6	0.50			
058-81	0.48			1.3		7.8D	2.3D	0.1	0.2	10.4				9.5	0.56			
081-99	0.12			0.4		3.5D	0.5D	TR	0.1	4.1				1.9	0.50			
099-130	0.11			0.4		1.6D	0.5D	TR	0.1	2.2				1.4	0.61			
130-155	0.09			0.6		6.0D	1.3D	0.1	0.1	7.5				4.1	0.33			
000-20	2.02																	

IDENTIFICATION OF THE SPODIC HORIZON BY LABORATORY CRITERIA. (E)

DEPTH	HORIZON	(PYROPHOSPHATE,PH10) (CIT - DIT)			(PYROPHOSP)		PYRO	CEC
		6C5A	6G5A	6A1B	6C2A	6G7A	FE+AL	-1/2
		EXT	EXT	EXT	EXT	/	/	CLAY
		FE	AL	C	FE	AL	C - D	X
CM		PCT	PCT	PCT	PCT	PCT	FE+AL	THIC
013-30	B1RM	.24	.08		.7	.05		71

(A) COLLECTED 90 M SOUTH OF 42-2 FROM A FIELD OF TIMOTHY.

(B) ESTIMATED.

(C) ORGANIC CARBON IS 7 KG PER SQ M TO A DEPTH OF 1 METER (METHOD 6A).

(D) METHODS 6N4C FOR CA AND 6O4C FOR MG.

(E) BELTSVILLE SOIL SURVEY INVESTIGATIONS UNIT, USDA-SCS, BELTSVILLE, MD.

Soil classification: Typic Eutroboralf; fine-loamy, mixed.

Soil: Emmet taxadjunct*.

Soil No.: 868WT-42-2.

Location: Oconto County, Wisconsin; SE $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 20, T. 27 N., R. 20 E.; 120 feet north of road and 12 feet west of line fence.

Climate: Climate is continental. Mean annual temperature is about 43° F; mean annual precipitation ranges from 28 to 31 inches; and average frost-free season is 133 days.

Vegetation and land use: Native vegetation was mixed hardwood forest with sugar maple, beech, ash, aspen, and hemlock the principal species. A large part of this soil is cultivated with small grains, fruits, corn, and forages being the main crops.

Parent material: Highly calcareous gravelly loam to sandy loam glacial till.

Physiography: Gently sloping to steep side slopes of drumlins and glacial till plains.

Topography: Undulating ground moraine. Site is on a 3 percent convex slope with a west aspect.

Drainage: Well and moderately well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: A. Klingelhoets, R. Fox, E. Link, Aug. 22, 1968.

(Colors are for moist soils unless otherwise noted)

01 1-1/2 to 0 cm (1/2 to 0 inch). Mat of partially decomposed hardwood leaves, twigs, and stems with some grasses.

A1 68L1098 0 to 5 cm (0 to 2 inches). Very dark gray (10YR 3/1) fine sandy loam; moderate fine crumb structure; friable; many of the sand grains have been stripped of their color coatings; many roots; neutral; abrupt wavy boundary.

A2 68L1099 5 to 13 cm (2 to 5 inches). Grayish brown (10YR 5/2) fine sandy loam; weak medium platy structure; friable; roots common; slightly acid; clear wavy boundary.

B1r 68L1100 13 to 30 cm (5 to 12 inches). Dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; 5 percent of volume made up of stones 3/4 to 3 inches in diameter and 3 percent larger stones; roots common; slightly acid; gradual wavy boundary.

A'2 68L1101 30 to 41 cm (12 to 16 inches). Brown (7.5YR 5/2) sandy loam; moderate coarse platy structure; slightly hard and brittle when dry (weak fragipan); friable when moist; vesicular; 5 percent of volume comprised of stones 3/4 to 3 inches in diameter and 3 percent larger stones; roots common to few; slightly acid; abrupt wavy boundary.

A'3 68L1102 41 to 59 cm (16 to 22 inches). Reddish brown (5YR 4/2) fine sandy loam; moderate coarse platy structure; slightly hard and brittle when dry (weak fragipan); friable when moist; vesicular; 5 percent of volume comprised of stones 3/4 to 3 inches in diameter and 3 percent larger stones; roots common to few; slightly acid; abrupt wavy boundary.

SOIL CLASSIFICATION-TYPIC GLOSSOBORALF
COARSE-SILTY, MIXED
SERIES - - - - - FENCE TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY

LINCOLN, NEBRASKA

GENERAL METHODS - - 1A, 1B1B, 2A1, 2B

SAMPLE NOS. 72L850-72L859

DEPTH HORIZON (- - - - -) PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B (- - - - -) RATIO
SAND SILT CLAY FINE (- - - - - SAND - - - - -) (- - - - - SILT - - - - -) INTR FINE NON- SD1
CLAY VCOS COBS MEDS FMS VFS COSI FMSI VPSI SAND II CLAY CO3- 15-

CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	TO
		(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)
000-2	A2	40.4	52.7	6.9	1.6	.4	2.4	5.6	16.2	15.8	27.0	25.7		28.6	51.3	23	.67
002-14	B2H1P	52.9	40.9	6.2	.8	.5	2.3	5.3	23.0	20.9	27.6	13.3		32.0	63.6	43	.74

014-36	B22IR	48.9	46.2	4.9	.5	.4	2.0	4.5	20.3	21.7	29.8	16.4		27.2	64.5	10	.84
036-54	A'2	33.5	57.2	9.3	1.7	.2	.7	1.2	8.0	23.4	37.9	19.3		10.1	67.4	18	.57
054-65	A8B'	38.7	52.3	9.0	2.2	TR	.2	.6	13.9	24.0	36.3	16.0		14.7	70.4	24	.61
065-75	B8A'	25.0	63.1	11.9	3.3	.1	.6	1.2	4.2	18.9	41.3	21.8		6.1	63.6	28	.49
075-119	B'21T	10.6	73.4	16.0	6.4	TR	.5	.6	.9	8.6	39.0	34.4		2.0	48.2	40	.48
119-149	B'22T	8.0	74.3	17.7	7.7	.1	.3	.3	.6	6.7	38.7	35.6		1.3	45.7	44	.49
149-179	B'3T	9.5	73.5	17.0	6.9	.1	.2	.3	.6	8.3	41.3	32.2		1.2	50.0	41	.51
179-210	C	9.7	73.5	16.8	7.2	TR	.2	.3	.6	8.6	42.1	31.4		1.1	51.1	43	.51

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (BULK DENSITY) (- - - - -) WATER CONTENT (- - - - -) CARBONATE (- - - - -) PH (- - - - -)
	VOL. (- - - - -) WEIGHT (- - - - -) 4A1D 4A1H 4D1 4B1C 4B1C 4B2 4C1 6B1B 3A1A 8C1A 8C1B
	GT GT 75-20 20-5 5-2 LT 20-2 1/3- OVEN COLE 1/10 1/3- 15- WED LT LT 1/1 1/2
CM	PCT PCT (- - - - -) PCT LT 75 (- - - - -) LT20 G/CC G/CC PCT PCT PCT CM PCT PCT
000-2	TR 0 0 TR TR 71 TR 1.0 A 1.30 .011 33.4 24.4 4.6 5.8 5.3
002-14	TR 0 0 TR TR 62 TR 1.26 1.30 .011 33.4 24.4 4.4 .26 .9B 5.3 4.7
014-36	TR 0 0 TR TR 67 TR 1.35 1.36 .003 25.1 18.3 4.1 .20 4.1B 5.3 4.6
036-54	TR 0 0 TR TR 85 TR 1.4 A 1.54 1.58 .009 25.1 21.1 5.3 5.1 4.3
054-65	TR 0 0 TR TR 79 TR 1.54 1.58 .009 25.1 21.1 5.5 .25 3.5B 5.1 4.3
065-75	TR 0 0 TR TR 90 TR 1.50 1.58 .017 24.2 21.2 5.8 .23 2.3B 5.0 4.2
075-119	TR 0 0 TR TR 97 TR 1.53 1.58 .011 26.6 25.4 7.6 .28 7.6B 4.9 4.2
119-149	TR 0 0 TR TR 98 TR 1.5 A 8.7 5.0 4.3
149-179	0 0 0 0 98 0 1.46 1.52 .014 29.2 28.1 8.6 .28 3.1B 5.1 4.5
179-210	TR 0 0 TR 98 TR 1.5 A 8.5 5.3 4.6

DEPTH	(ORGANIC MATTER) IRON PHOS (- - - - -) EXTRACTABLE BASES 5B4A (- - - - -) ACTY AL (CAT EXCH) RATIO RATIO CA (BASE SAT)
	6A1A 6B1A C/H 6C2B 6N2E 6O2D 6P2B 6Q2B 6H1A 6G1E 5A3A 5A6A 8D1 8D3 5P1 5C3 5C1
	ORGN NITG EXT TOTL CA HG NA K SUM BACL KCL EXTB TEA EXT ACTY TO TO NHAC NHAC SAT EXTB NHAC
CM	PCT PCT PCT PCT (- - - - -) -HEQ / 100 G- (- - - - -) CLAY HG PCT PCT PCT
000-2	1.22C .097 13 .8 6.6 .5 TR .2 7.3 5.2 12.5 9.0 1.30 13.0 73 58 81
002-14	.87 .077 11 1.3 3.5 .4 TR .1 4.0 10.7 .5 14.7 9.0 1.45 8.8 39 27 44
014-36	.67 .056 12 1.2 2.3 .3 TR .1 2.7 10.2 .8 12.9 7.7 1.57 7.7 30 21 35
036-54	.16 .018 9 1.4 2.7 .7 TR .2 3.6 7.0 1.2 10.6 7.6 .82 3.9 36 34 47
054-65	.16 .020 8 1.6 2.7 .8 .1 .2 3.8 7.3 1.2 11.1 7.5 .83 3.4 36 34 51
065-75	.11 1.2 3.1 1.1 .1 .2 4.5 7.1 1.6 11.6 9.0 .76 2.8 34 39 50
075-119	.12 1.3 4.3 1.7 .1 .2 6.3 7.9 1.5 14.2 10.8 .68 2.5 40 44 58
119-149	.09 1.4 5.7 2.3 .1 .3 8.4 7.5 .9 15.9 12.2 .69 2.5 47 53 69
149-179	.08 1.3 6.5 2.6 .1 .3 9.5 6.9 .6 16.4 12.8 .75 2.5 51 58 74
179-210	.08 1.2 7.2 2.8 .2 .3 10.5 4.9 .4 15.4 12.4 .74 2.6 58 68 85

DEPTH	(SATURATED PASTE) NA NA SALT GYP (- - - - -) SATURATION EXTRACT 8A1- (- - - - -) AFTERBERG
	8B1 8C1B 8A 5D2 5B 8D5 6P1A 8A1A 6N1B 6O1B 6P1B 6Q1B 6I1A 6J1A 6K1A 6L1A 6M1A 4P1 4P2
	REST PH H2O ESP SAR TOTL EC CA HG NA K CO3 HCO3 CL SO4 NO3 LIQD FLST
CM	CM PCT PCT PPH PCT CM (- - - - -) -HEQ / LITER (- - - - -) PCT
000-2	
002-14	

Soil classification: Typic Glossoboralf; coarse-silty, mixed

Soil: Fence taxadjunct*.

Soil No. S72WI-21-6 (LSL Nos. 72L850-72L859).

Location: Forest County, Wisconsin; SW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 8, T. 34 N., R. 14 E.; near county road W and Switzer Point Road.

Climate: Humid continental; mean annual temperature is about 41° F; mean annual precipitation is 30 inches; and frost-free season is about 130 days.

Vegetation and land use: Native vegetation was northern hardwoods. Cutover areas are in aspen. Small areas have been cleared and are used for general farming. Some wooded areas are used for livestock pasture.

Parent material: Silt and sand lacustrine deposits in old glacial lake plains.

Physiography: Nearly level to sloping glacial lake plains.

Topography: Site is on a 1 percent plane slope.

Drainage: Moderately well and well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: Steve Payne and Robert Fox.

Sampled by: Robert H. Jordan and Robert L. Juve, September 19, 1972

(Colors are for moist soils unless stated otherwise)

O1 4 to 0 cm (1-1/2 to 0 inches). Dark reddish brown (5YR 2/2) organic matter; weak fine granular structure; many roots; a few sand grains; abrupt boundary.

A2 72L850 0 to 2 cm (0 to 3/4 inch). Brown (7.5YR 4/2) very fine sandy loam; weak medium platy structure; very friable; many roots; medium acid; abrupt boundary.

B21hr 72L851 2 to 14 cm (3/4 to 5-1/2 inches). Mixture of brown (7.5YR 4/2 and 4/4) very fine sandy loam; weak medium subangular blocky parting to fine granular structure; very friable; many roots; clear boundary.

B22lr 72L852 14 to 36 cm (5-1/2 to 14 inches). Brown (7.5YR 4/4) very fine sandy loam; weak fine subangular blocky structure; very friable; many roots; strongly acid; clear boundary.

A'2 72L853 36 to 54 cm (14 to 21 inches). Brown (7.5YR 5/4 and 4/4) very fine sandy loam; weak medium platy structure parting to very weak very fine subangular blocky structure; very friable; silt coatings on faces of peds; vesicular; few roots; strongly acid; abrupt boundary.

A&B' 72L854 54 to 65 cm (21 to 26 inches). Brown (7.5YR 5/4) silt loam with a few fine prominent mottles of yellowish red (5YR 5/8) and faint mottles of reddish brown (5YR 4/4); weak fine platy and subangular blocky structure; friable; vesicular; few roots; strongly acid; abrupt boundary.

B&A' 72L855 65 to 75 cm (26 to 30 inches). Reddish brown (5YR 5/4) and brown (10YR 5/3) silt loam with a few medium prominent mottles of yellowish red (5YR 4/8); weak medium subangular blocky structure; friable; few lenses of fine sand at the boundary of the A&B' and B&A' horizons; vesicular; few patchy clay films on Bt peds; few roots; strongly acid; clear boundary.

B'21t 72L856 75 to 119 cm (30 to 47 inches). Brown (7.5YR 4/4) silt loam with a few fine faint mottles of reddish brown (5YR 4/4) and specks of dark reddish brown (5YR 3/3); moderate medium subangular blocky structure with a macrostructure of coarse weak prismatic; firm; many thick patchy clay films; few roots; few iron concretions; very strongly acid, gradual boundary.

B'22t 72L857 119 to 149 cm (47 to 59 inches). Reddish brown (5YR 5/3) silt loam with common medium prominent mottles of yellowish red (5YR 4/6 and 5/6); weak medium subangular blocky structure; firm; thick patchy clay films common; strongly acid; clear boundary.

B'3t 72L858 149 to 179 cm (59 to 71 inches). Brown (7.5YR 5/4) silt loam with common medium distinct mottles of yellowish red (5YR 4/6) and a few dark specks and streaks of dark reddish brown (5YR 3/3 and 3/2); weak medium subangular blocky structure; firm; few discontinuous clay films; strongly acid; clear boundary.

C 72L859 179 to 210 cm (71 to 84 inches). Brown (7.5YR 5/4) silt and very fine sand with few medium distinct mottles of yellowish red (5YR 5/6); weak medium subangular blocky structure; friable; few small manganese concretions; strongly acid.

Remarks: These are moderately well and well drained soils and at the sampling site are nearly level. A sample of the B'21t horizon of this soil was sent to the University of Wisconsin for examination of thin section.

*This pedon lacks a spodic horizon; therefore, it is a taxadjunct to the Fence series.

SOIL CLASSIFICATION-TYPIC GLOSSOBORALF
FINE-LOAMY, MIXED

SERIES - - - - - FENWOOD

SOIL NO - - - - - S70WIS-37-4 COUNTY - - - MARATHON

GENERAL METHODS- - 1A, 1B18, 2A1, 2B

SAMPLE NOS. 70L894-70L900

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -)RATIO														
		SAND	SILT	CLAY	FINE	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	FAML	INTR	FINE
		2-	.05-	LT	CLAY	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	2-	TO
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY
		PCT LT 2MM - - - - -) PCT PCT CLAY														
000-21	AP	22.9	65.9	11.2		3.0	4.4	3.7	5.8	6.0	31.7	34.2		16.9	40.6	.65
021-30	A2	47.0	44.7	8.3	3.6	6.4	11.5	7.8	11.4	9.9	22.0	22.7		37.1	37.8	.54
030-45	A&B	46.8	40.6	12.6	6.9	6.7	11.4	7.8	11.4	9.5	20.0	20.6		37.3	35.5	.44
045-62	B&A	41.2	39.6	19.2	11.3	3.8	9.9	7.1	10.9	9.5	19.0	20.6		31.7	34.4	.39
062-79	B2LT	44.9	35.8	19.3	11.6	7.8	11.8	7.1	10.0	8.2	16.3	19.5		36.7	29.7	.38
079-110	B22T	43.3	37.4	19.3	11.0	6.9	10.1	6.6	10.6	9.1	16.5	20.9		34.2	31.4	.42
000-21	AP (A)															

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (BULK DENSITY) (- - - - -) WATER CONTENT - - - - -) CARBONATE (- - - - -)										(- PH - -)							
	VOL. (- - - - -) WEIGHT - - - - -)					4A10	4A1H	401	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E		
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3- OVEN	COLE	1/10	1/3-	15- WRD	LT	LT	1/1	1/2		
	2	75				.074	PCT	BAR	DRY	BAR	BAR	BAR	CM/	2	.002	H2O	CACL	
CM	PCT	PCT	(- - -	PCT	LT	75	(- - -)	LT20	G/C	G/C	PCT	PCT	PCT	CM	PCT	PCT		
000-21	5	0	TR	2	4	77	6	1.30	1.36	.014	29.1	28.3	7.3	.26	3.1C		5.2	5.1
021-30	5	0	TR	4	5	54	9	1.61	1.63	.004	18.8	16.1	4.5	.18	5.6C		5.7	5.2
030-45	10	0	10	5	TR	50	6	1.50	1.61	.021	18.9	16.6	5.6	.15	4.0C		5.3	4.7
045-62	5	0	10	TR	TR	35	4	1.50B					7.4				4.4	3.9
062-79	15	0	15	5	TR	50	5	1.56	1.64	.014	21.6	19.4	7.3	.16	3.1C		4.4	3.7
079-110	20	0	30	TR	TR	10	12	1.70B					8.1				4.1	3.7
000-21	3	0	0	2	3	5							7.3				5.3	5.1

DEPTH	(ORGANIC MATTER)		IRON	PHOS	(- - - - -) EXTRACTABLE BASES 5B4A- - -)				ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)	
	6A1A	6B1A	C/N	6C2B	6N2E	6O2D	6P2B	6Q2B	6M1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1
	ORGN	NITS		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	CA	SAT	EXTB
CM	PCT	PCT		FE	PCT	(- - - - -)	-MEQ / 100	-MEQ / 100	G- - - - -)	EXTB	TEA	EXT	ACTY	YD	TO	NHAC	ACTY
000-21	2.490	.217	11	1.2		9.3	1.5	0.1	0.4	11.3	9.9	0.1	21.2	15.7	1.40	6.2	59
021-30	0.35	.034	10	1.4		4.7	0.9	0.1	0.2	5.9	5.5	0.1	11.4	9.1	1.10	5.2	52
030-45	0.23	.024	10	1.6		4.9	1.2	0.1	0.2	6.4	6.6	0.4	13.0	10.6	0.84	4.1	46
045-62	0.19	.018		1.9		4.4	1.2	0.1	0.2	5.9	10.8	1.7	16.7	12.7	0.66	3.7	35
062-79	0.18			1.9		3.3	1.3	0.1	0.2	4.9	10.6	2.2	15.5	12.1	0.63	2.5	27
079-110	0.11			2.0		4.0	1.6	0.1	0.2	5.9	12.7	2.4	18.6	14.6	0.76	2.5	27
000-21	2.33	.216	11														32

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	SATURATION EXTRACT 8A1-										ATTERBERG	
	BE1	8C1B	8A	5D2	5E	BD5	6F1A	8A1A	6N18	6O18	6P18	6Q18	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2	
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	MD3	CL	SO4	NO3	LQID	PLST	
	OHM-					SOLU		MMHDS/										LMIT	INDX	
CM	CM		PCT	PCT		PPM	PCT	CM	(				MEQ / LITER					PCT	
000-21																				
021-30																				
030-45																				
045-62																				
062-79																				
079-110	5200	4.2	28.7	1		80		0.54	2.4	1.1	0.6	0.1								
000-21																				

- (A) COMPOSITE OF SEVERAL SURFACE SAMPLES.
(B) ESTIMATED.
(C) MICRO-PENETRATION RESISTANCE - A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 1/10- BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.
(D) ORGANIC CARBON IS 9 KG/M SQ TO A DEPTH OF 1 M (6A).

Soil classification: Typic Glossoboralfs; fine-loamy, mixed.

Soil: Fenwood.

Soil No.: S7OWI-37-4.

Location: Marathon County, Wisconsin; NE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 28, T. 29 N., R. 6 E.; 125 feet west of town road and 300 feet south of barn.

Climate: Humid-continental; mean annual temperature is about 43° F; mean annual precipitation is about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Natural vegetation was mixed hardwood forest. Much of this soil has been cleared and is used for general farming and pasture.

Parent material: Thin silty sediments over residuum from fine-grained granite and greenstone rocks.

Physiography: Gently sloping to moderately steep rock-controlled upland.

Topography: Site is on a southeast 3 percent plane slope in a cultivated field.

Drainage: Well drained.

Ground water: Deep

Erosion: Slight.

Permeability: Moderate.

Described by Paul H. Carroll

(Colors are for moist soils unless otherwise stated)

Ap 70L894 0 to 21 cm (0 to 8 inches). Very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine and very fine subangular blocky structure; friable; many fine roots; very few (less than 1 percent) greenstone and fine-grained granitic fragments 2 to 75 mm in diameter; medium acid; abrupt smooth boundary.

A2 70L895 21 to 30 cm (8 to 12 inches). Grayish brown (10YR 5/2) and brown (10YR 5/3) very fine sandy loam; weak thin platy structure parting to weak fine subangular blocky structure; friable; common fine fibrous roots; 3 percent by volume of greenstone and fine-grained granite fragments 2 to 75 mm in diameter; medium acid; clear wavy boundary.

A&B 70L896 30 to 45 cm (12 to 18 inches). Brown (10YR 5/3) light loam (A2); weak thin platy structure; friable; occupies about 60 percent of the horizon and completely surrounds or intermingles with remnants of the Bt; dark yellowish brown (10YR 4/4) loam (B2t); weak fine subangular blocky structure; friable; common fine fibrous roots; few thin clay films on faces of peds and in pores; 5 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (7 percent 2 to 75 mm); strongly acid; clear wavy boundary.

B&A 70L897 45 to 62 cm (18 to 24 inches). Dark brown (7.5YR 4/4) loam (Bt); moderate medium subangular blocky structure; firm; occupies about 70 percent of the horizon and consists of upward extensions of the underlying Bt horizons; many thin clay films on faces of peds and in tubular pores; tongues of brown (10YR 5/3-5/4) loam (A2); weak thin platy structure; friable; 5 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (7 percent 2 to 75 mm); very strongly acid; clear wavy boundary.

B21t 70L898 62 to 79 cm (24 to 31 inches). Dark brown (7.5YR 4/4) loam; moderate medium angular and subangular blocky structure; very firm; few fine fibrous roots; many thin clay films on faces of peds and in tubular pores; 10 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (14 percent 2 to 75 mm); very strongly acid; clear wavy boundary.

B22t 70L899 79 to 110 cm (31 to 43 inches). Dark brown (7.5YR 4/4) gravelly loam; moderate medium angular blocky structure; very firm; continuous thin clay films on faces of most peds and in tubular pores; 20 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (30 percent 2 to 75 mm); grades below 43 inches (110 cm) to a concentration of angular and subangular rock fragments that makes further penetration unfeasible; strongly acid.

S49WI-4-3

Beltsville Soil Survey Lab. Nos. 491011-491019

Depth cm	Horizon	M.E./100 Grams Soil						% B. SAT	pH	% O.C.	Size Classes %							
		Ca	Mg	K	Na	1 H	2 S+				Clay	111	3 USDA Silt	VFS	FS	MS	CS	VCS
3.5-0	0a	--	--	--	--	--	--	--	4.8	--	--	--	--	--	--	--	--	--
0-8	A21	2.9	1.4	0.2	<0.1	8.6	13.1	34	4.4	1.96	7.9	19.9	40.9	11.1	19.6	10.8	7.2	2.5
8-13	A22	3.9	1.4	0.2	<0.1	10.1	15.6	35	5.1	1.61	8.6	19.0	40.2	11.3	19.5	11.2	7.1	2.1
13-23	B21hir	3.6	1.4	0.2	<0.1	14.1	19.3	27	5.3	1.56	8.8	17.8	37.4	10.6	20.4	11.6	7.9	3.3
23-35	B22ir	2.0	1.4	0.2	<0.1	9.9	13.5	27	5.6	0.86	6.9	14.6	32.8	13.0	23.6	12.3	8.4	3.0
35-42	B23irx	1.5	1.3	0.1	<0.1	7.3	10.2	28	5.7	0.53	6.4	12.7	29.2	14.2	25.2	13.1	8.6	3.3
42-60	A'2x	1.1	1.0	0.1	<0.1	4.0	6.2	35	5.8	0.20	4.0	11.8	26.6	14.3	26.9	14.3	10.0	4.0
60-100	B'2tx	1.7	1.3	0.1	<0.1	2.7	5.8	53	5.4	0.10	5.6	12.2	28.1	14.8	26.5	13.4	8.4	3.2
100-130	C1	1.6	1.4	<0.1	<0.1	2.0	5.0	60	5.3	0.04	4.0	8.1	19.2	11.6	29.2	21.2	11.6	3.2

1 Acidity

2 CEC by sum of cations

3 International III - This is PSDA fine silt (.02-.002 mm).

Soil classification: Typic Fragliorthods; coarse-loamy, mixed, frigid.

Soil: Gogebic taxadjunct*.

SoilNo.: S49WI-4-3.

Location: Bayfield County, Wisconsin; SW $\frac{1}{4}$ of Sec. 11, T. 44 N., R. 6 W.; 50 feet east of county highway D across the road from watershed elevation divide marker.

Climate: Average annual precipitation is 28 to 30 inches. Mean annual air temperature is about 37° to 43° F. Mean summer temperature is 60° to 67° F. Frost-free season is 90 to 105 days.

Vegetation and land use: Most of the soil has a mixed hardwood with scattered conifer forest cover. Hard maple, oak, birch, basswood, hemlock, white pine, and aspen are the principal tree species. Small areas have been cleared and are used for general farming.

Parent material: Fine sandy loam acid glacial till.

Physiography: Gently sloping to hilly upland.

Topography: Near the crest of a large ridge on a 3 to 4 percent slope.

Drainage: Moderately well to well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate in upper part, moderately slow in the fragipan.

(Colors are for moist soil unless otherwise stated)

O1 Thin layer of maple, oak, and aspen leaves mixed with twigs and acorns.

Oa 491011 3.5 to 0 cm (1-1/2 to 0 inches). Black (10YR 2/1) organic mat, very dark grayish brown to very dark brown (10YR 3/2 to 2/2) dry; partially decomposed mat of organic matter bound together with many fine fibrous roots; many fragments of wood and charcoal; very strongly acid.

A21 491012 0 to 8 cm (0 to 3 inches). Reddish gray (5YR 5/2) loam, pinkish gray (5YR 6/2) dry; dark reddish gray (5YR 4/2) wet; coarse platy structure; friable; many fine fibrous roots; few pebbles; very strongly acid.

A22 491013 8 to 13 cm (3 to 5 inches). Dark reddish gray (5YR 4/2) loam, light reddish brown (5YR 6/3) dry, dark reddish brown (5YR 3/3) wet; weak fine subangular blocky structure parting to weak fine granular structure; friable; few pebbles; many roots; some humus accumulation; strongly acid.

B21b2 491014 13 to 23 cm (5 to 9 inches). Dark reddish brown (5YR 3/3) loam, light reddish brown (5YR 6/3) dry, dark reddish brown (5YR 3/3) wet; weak fine subangular blocky structure parting to weak fine granular structure; friable; few pebbles; many roots; some humus accumulation; strongly acid.

SOIL CLASSIFICATION-ALFIC FRAGIORTHOD
COARSE-LOAMY, MIXED, FRIGID
SERIES - - - - -GOGEBIC TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S72WI-63-1 COUNTY - - - VILLAS

GENERAL METHODS - - -1A, 1B1B, 2A1, 2B

SAMPLE NOS. 72L886-72L893

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -) RATIO															
		SAND	SILT	CLAY	FINE	VCOS	CORS	HEDS	FWES	VFWS	COSI	FWSI	VFSI	SAND	WTR	FINE	NON- 8D1
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY BAR
CM		(	-.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY TO
		PCT LT 2MM - - - - -) PCT PCT CLAY															
000-6	A2	56.5	38.2	5.3	1.4	1.7	6.3	13.8	22.5	12.2	16.1	22.1		44.3	38.7	26	.74
006-20	B21H1R	60.2	32.9	6.9	.6	2.1	5.6	12.1	22.5	17.9	17.1	15.8		42.3	46.4	9	1.80
020-35	B22IR	62.7	31.0	6.3	.8	3.1	7.9	14.6	23.5	13.6	15.9	15.1		49.1	40.8	13	.90
035-57	B23IR	64.7	30.3	5.0	.7	3.1	7.6	15.0	24.6	14.4	16.4	13.9		50.3	42.5	14	.82
057-83	A'2X	67.8	28.3	3.9	.9	3.0	8.1	16.0	25.9	14.8	15.7	12.6		53.0	42.9	23	.56
083-98	A&BT'	65.8	30.0	4.2	.4	3.5	8.0	14.7	24.9	14.7	17.1	12.9		51.1	43.8	10	.38
098-127	B21't	66.2	28.9	4.9	.9	3.1	7.9	15.3	26.0	13.9	15.7	13.2		52.3	42.3	18	.39
127-162	B22't	52.3	34.5	13.2	4.4	2.1	5.8	11.5	20.2	12.7	18.1	16.4		39.6	40.7	33	.37

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2 (BULK DENSITY) (- - - - -) WATER CONTENT - - - - -) CARBONATE (- - - - -) PH - - -)													
	VOL. (- - - - -) WEIGHT - - - - -)	4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1B	8C1C	8C1D
	GT 75 20-5 5-2 LT 20-2 1/3- OVER COLE 1/10 1/3- 15- WRD LT LT 1/1 1/2	GT	GT	75-20	20-5	5-2	LT	20-2	1/3- OVER COLE	1/10	1/3- 15- WRD	LT	LT	1/1 1/2
CM	PCT PCT (- - - - -) PCT LT 75 - - - - -) LT20 6/CC 6/CC PCT PCT PCT CH PCT PCT													
000-6	5 TR 5 2 2 46 4													
006-20	5 TR 5 8 6 41 15	.81	.93	.045	48.0	41.2	12.4	.21	.9A					
020-35	10 TR 5 6 7 37 14													
035-57	10 TR 5 8 6 35 15													
057-83	20 5 10 9 6 30 17													
083-98	20 5 10 7 5 33 13													
098-127	20 5 10 7 5 33 13													
127-162	15 5 10 5 5 44 11	1.88	1.88	.000	13.8	11.5	4.9	.11	4.3A					

DEPTH (ORGANIC MATTER)			IRON	PHOS	(- - - - -) EXTRACTABLE BASES 5B4A- - -)								ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)	
6A1A	6P1A	C/N	6C2B	6N2R	6O2D	6P2B	6Q2B					6R1A	6G1R	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1	
ORGN	WGTG		EXT	TOTL	CA	HG	NA	K	SUN			BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC	
CARB			YE						EXTB			TRA	EXT	ACTY		TO	TO	NHAC	ACTY		
CH	PCT	PCT	PCT	PCT	(- - - - -)	-REQ	-REQ	-REQ	-REQ	-REQ	-REQ	G-	G-	G-	G-	CLAY	HG	PCT	PCT	PCT	
000-6	1.63		1.0		1.0	.3	.1	.1	1.5	8.2	1.9	9.7	8.4	1.58	3.3		12	15	18		
006-20	3.80		1.8		.4	.1	TR	.1	.6	36.5	5.1	37.1	22.7	3.29	4.0		2	2	3		
020-35	1.10		1.0		.3	.1	TR	TR	.4	15.9	2.4	16.3	9.5	1.51	3.0		3	2	4		
035-57	.79		1.0		.3	.1	TR	.1	.5	11.7	1.8	12.2	7.1	1.42	3.0		4	4	7		
057-83	.27		1.0		.2	.1	TR	TR	.3	6.9	1.0	7.2	3.8	.97	2.0		5	4	8		
083-98	.05		.9		1.3	.6	.1	TR	2.0	2.8	.4	4.8	3.8	.90	2.2		34	42	53		
098-127	.18		1.0		1.9	.9	.1	.1	3.0	2.2	.1	5.2	3.9	.80	2.1		49	58	77		
127-162	.16		1.3		4.4	2.4	.1	.1	7.0	2.5		9.5	7.8	.59	1.8		56	74	90		

Soil classification: Alfic Fragiorthod; coarse-loamy, mixed, frigid.

Soil: Gogebic taxadjunct*.

Soil No.: S72WI-63-1 (LSL Nos. 72L886-72L893).

Location: Vilas County, Wisconsin; SE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 2, T. 43 N., R. 6 E.; near county road 13.

Climate: Humid continental; mean annual air temperature is about 41° F mean annual precipitation ranges from 28 to 32 inches; and frost-free season is about 90 to 180 days.

Vegetation and land use: Native vegetation was mixed northern hardwood and conifer forests. Most of this soil is in forest. Small areas have been cleared for general farming and some areas are used for livestock pasture.

Parent material: Acid fine sandy loam glacial till.

Physiography: Gently sloping to undulating and rolling glacial ground and recessional moraines.

Topography: Site is on a convex 3 percent slope in a forested area with many hummocks.

Drainage: Moderately well and well drained

Ground water: Deep.

Erosion: Slight.

Permeability: Moderately slow in the fragipan, and moderate in remainder of profile.

Described by: Steve Payne and Robert Fox

Sampled by: Robert H. Jordan and Robert L. Juve, September 19, 1972

(Colors are for moist soil unless otherwise stated)

O1 4 to 0 cm (1-1/2 to 0 inches). Dark colored decomposed leaves. Hummocky.

A2 72L886 0 to 6 cm (0 to 2 inches). Weak red (2.5YR 5/2) fine sandy loam; weak fine platy structure; very friable; few roots; few fine gravel; strongly acid; clear boundary.

B21hr 72L887 6 to 20 cm (2 to 8 inches). Dark reddish brown (2.5YR 3/4) fine sandy loam; moderate fine subangular blocky structure; very friable; many roots; strongly acid; clear boundary.

B221r 72L888 20 to 35 cm (8 to 14 inches). Dark red (2.5YR 3/6) fine sandy loam; moderate medium subangular blocky structure; very friable; many roots; few fine gravel; strongly acid; clear boundary.

B231r 72L889 35 to 57 cm (14 to 23 inches). Dark red (2.5YR 3/6) fine sandy loam; weak medium subangular blocky structure; firm, brittle, weakly cemented; few pores; few roots; strongly acid; clear boundary.

A'2x 72L890 57 to 83 cm (23 to 33 inches). Reddish brown (2.5YR 4/4) fine sandy loam; massive; firm, brittle, moderate cementation; vesicular; about 10 percent fine and medium gravel; strongly acid; clear boundary.

A&Bt' 72L891 83 to 98 cm (33 to 39 inches). Weak red (2.5YR 4/2) and reddish brown (2.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; few clay films on peds of Bt in this horizon; few pebbles; many fine pores; strongly acid; clear boundary.

B21't 72L892 98 to 127 cm (39 to 51 inches). Reddish brown (2.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; friable; many thick continuous clay films; few fine gravel and 5 percent of coarse gravel; strongly acid; clear boundary.

B22't 72L893 127 to 162 cm (51 to 65 inches). Reddish brown (2.5YR 4/4) heavy fine sandy loam with a few coarse distinct mottles of pinkish gray (7.5YR 6/2); weak medium subangular blocky structure; friable; many thin clay films and clay bridges; a few fine gravel; medium acid.

Remarks: Stones make up about 5 percent of the soil mass throughout the profile. There is about 10 percent medium gravel below 57 cm. A sample of the B3t horizon was given to the University of Wisconsin for thin section inspection.

*This pedon is a taxadjunct to the Gogebic series because it lacks an A1 horizon and some of the colors are outside the series range.

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 74L841-74L849

DEPTH CM	HISTOSOL CHARACTERIZATION											
	(STATE OF DECOMPOSITION)				PH (BULK DEN)		COLE	SUBS	(WATER CONTENT)			
	8F	8G	8M	8C1E	4A3A	4A11	4D1		4B4	4B1C	4B2	4C1
	MINL (FIBER CONT UNRB PCT	VOL RUB PCT	PYROPHOSPH SOLUBILITY (MUNS COLOR)	.01M CACL	FIELD STAT	1/3B RENT	RE- WET	RES- IDUE PCT	FIELD STAT	1/3B RENT	15- BAR	MRD CM/ CM
C60-010		88	44	10YR	7.5/4	3.0						99.0
C10-014		31	18	10YR	5/3	3.0						77.8
C16-050	6	26	11	10YR	6/3	3.1	.12		63	787		61.1
C50-C90	4	32	14	10YR	6/4	3.1	.09		48	1090		38.7
O90-135	1	22	11	10YR	5/3	3.3	.07		39	1250		76.7
135-155	1	34	28	10YR	7/3	3.4	.7		39	1380		79.3
155-200		38	31	10YR	6/3	3.4						
200-260		64	37	10YR	6/3	3.5						
260-300		47	29	10YR	6/3	3.6						

Soil classification: Typic Borosáprist, dysic.

Series: Greenwood taxadjunct.

Soil No.: S74WI-67-2.

Location: Langlade County, Wisconsin; SE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 26, T. 33 N., R. 10 E.; 200 feet west of road. About 45.2° north latitude and about 89.0° west longitude.

Climate: Humid continental. Mean annual temperature is 42.2° F; mean July temperature is 68.5° F; mean January temperature is 13.8° F; mean annual precipitation is 29.86 inches with nearly two-thirds of this during the growing season; total annual snowfall is 48 inches; frost-free season is 138 days at Antigo but less on the organic soil areas.

Parent material: Organic soil material derived from mosses, grasses, reeds, and sedges overlying limnic material.

Physiography: Deep depression associated with a lake which has filled in with organic material; surrounding uplands is part of the Cary recessional moraine and consists of rolling gravelly loam soils. Elevation is about 1,600 feet.

Vegetation: Scattered white birch, black spruce, tamarack, and white pine, with an understory of Labrador-tea, leatherleaf, cranberry, blueberry, sphagnum moss and native bog forbs.

Size of area: About 60 acres.

Distance to adjacent mineral soil: About 160 feet to east, north, and south; west side is bordering on Summit Lake.

Depth to water table: 1 foot.

Microrelief: Low hummocks of 6 to 18 inches over the entire bog.

Subsidence: No evidence of subsidence.

Soil temperature: Measured soil temperature of 11.5° C at 50 cm.

Described and sampled by: G. Hudelson, A.J. Klingelhoets, G.B. Lee, Warren Lynn, W.E. McKinzie, R. Newbury, and S. Payne on Aug. 7, 1974. Samples were obtained from a pit dug with a spade to 45 inches and then with a posthole digger and peat sampler below 45 inches.

Mat of living sphagnum with many live roots of sphagnum, shrubs, and forbs, about 5 cm thick. (Not sampled.)

O1 74L841 0 to 10 cm. Dark brown (10YR 3/3) broken face fibric material, very dark grayish brown (10YR 3/2) rubbed, and pale brown (10YR 6/3) pressed; fiber content 95 percent, 60 percent rubbed; primarily sphagnum fiber; matted structure; friable; less than 10 percent mineral material; many fine roots; pH 4.2 (Truog); abrupt wavy boundary.

Oe1 74L842 10 to 16 cm. Very dark brown (10YR 2/2) broken face. hemic material, black (10YR 2/1) rubbed and pressed; fiber content 40 percent undisturbed, rubbed 18 percent; weak fine subangular blocky structure; very friable; mixture of sphagnum and herbaceous fibers; many fine fibrous roots; 20 to 25 percent mineral matter; pH 4.3 (Truog); clear wavy boundary.

Oe2 74L843 16 to 50 cm. Very dark brown (10YR 2/2) broken face, hemic material, black (10YR 2/1) rubbed, very dark brown (10YR 2/2) pressed; fiber content 60 percent, 20 percent rubbed; fibers primarily herbaceous; sedge fibers are yellowish brown (10YR 5/4, 5/6); weakly matted to weak fine subangular blocky structure; very friable; 20 percent mineral matter; few sedge and forb roots; pH 4.3 (Truog); gradual irregular boundary.

Oe3 74L844 50 to 90 cm. Very dark brown (7.5YR 2/2) broken face hemic material; very dark brown (10YR 2/2) rubbed and pressed; about 70 percent fibers undisturbed, rubbed 20 percent; primarily herbaceous fibers; less than 20 percent mineral material; weak fine subangular to matted structure; very friable; few sedge roots; pH 4.3 (Truog); gradual wavy boundary.

Oe4 74L845 90 to 135 cm. Dark brown (7.5YR 3/2) broken face hemic material, very dark brown (7.5YR 2/2) rubbed and pressed; about 50 percent fiber unrubbed and 20 percent rubbed; weak medium subangular blocky structure; very friable; less than 20 percent mineral material; few wood fragments from spruce and tamarack; pH 4.5 (Truog); gradual wavy boundary.

Oe5 74L846 135 to 155 cm. Dark brown (7.5YR 3/2) broken face hemic material, very dark brown (7.5YR 2/2) rubbed and pressed; 50 percent fibers and 20 percent rubbed; primarily herbaceous material; less than 20 percent mineral content; weakly matted; very friable; pH 4.5 (Truog); gradual wavy boundary.

Oe6 74L847 155 to 200 cm. Sampled separately but not differentiated from the horizon above.

Oe7 74L848 200 to 260 cm. Sampled separately but not differentiated from the Oe5 horizon description.

Oe8 74L849 260 to 300 cm. Sampled separately but not differentiated from the Oe5 horizon description.

Remarks: At a depth of 144 to 160 inches, the peat contained a high percent (40 percent) of sedimentary peat. This material had a fiber content of 30 percent unrubbed and 10 percent rubbed. It was very dark brown (7.5YR 2/2) in color; massive; very friable; pH 5.8 (Truog).

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO		
		FINE (-)				SAND (1-)				SILT (-)				INTR	FINE	NON-	SD1	
		SAND	SILT	CLAY	CLAY	COCS	COCS	FNES	VFNES	COCS	FNES	VFNES	SAND	SAND	II	CLAY	COCS	19-
		2-	.05-	LT	LT	2-	1-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY	BAR	TO
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	TO	
		PCT LT 2MM														PCT		

000-008	011
008-013	011
013-023	0E1
023-050	CE2
050-070	CE3
070-100	CE4
100-180	CE5
180-312	LCO
312-370	2CG

[illegible][illegible][illegible]

DEPTH CM	HISTOSOL CHARACTERIZATION												
	(STATE OF DECOMPOSITION)				PH	(BULK DEN)		COLE	SUBS	(WATER CONTENT)			
	8F	8G	8H	8C1E	4A3A	4A1I	4D1		4B4	4B1C	4B2	4C1	
	MINL (FIBER VOL)	PYROPHOSPT	.01M	FILD	1/3B	RE-	RES-	FILD	1/3B	15-	WRD		
	CMNT	UNR8	RUB	SOLUBILITY	CACL	STAT	RENT	WET	IDUE	STAT	RENT	BAR	CM/
PCT	PCT	PCT	(MUNS COLOR)		G/CC	G/CC		PCT	PCT	PCT	PCT	PCT	CM/
C00-008		80	68	10 YR 6/4	3.3								101
008-013		45	6	10 YR 5/4	3.3								68.4
C13-023	7	61	8	10 YR 5/3	3.0	.16	.21	.17	60	542	352	45.5	.64
023-050	6	55	10	10 YR 6/4	3.1	.14	.20	.17	73	649	337	64.8	.54
C50-070	6	52	17	10 YR 7/4	3.2	.13	.11	.13	68	722	437	64.1	.41
070-100	2	53	23	7.5YR 6/4	3.4	.09	.05	.22	49	1060	1070	58.7	.51
100-180	4	50	22	10 YR 7/3	3.7	.08			43	963			
180-312	33	—	1		3.8	.09			34	1040			
312-370	99				3.7	.98				57			

Soil classification: Typic Borohemist; dysic.

Series: Greenwood.

Soil No.: S74WI-85-1.

Location: Oneida County, Wisconsin; SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 20, T. 35 N., R. 11 E.; 60 feet south of old highway in powerline right-of-way. About 45° 30' N. latitude about 89° 14' W. longitude.

Climate: Humid continental. Mean annual temperature is 41.6° F; mean July temperature is 68.4° F; mean January temperature is 12.8° F; mean annual precipitation is 30.78 inches with nearly two-thirds of the precipitation falling during the growing season; total amount of snow is 55.6 inches; the growing season averages 127 days, but less in organic areas (data from Rhinelander, WI, weather bureau substation.)

Parent material: Deposits of herbaceous material more than 51 inches thick.

Physiography: Large glacial depression in Cary drift.

Vegetation: Black spruce, tamarack, blueberry, Labrador-tea, and sphagnum moss.

Size of area: About 1,600 acres.

Distance to adjacent mineral soil: About 400 feet to the east.

Depth to water table: 75 cm.

Microrelief: Hummocky. Hummocks are 18 inches high.

Subsidence: None

Soil temperature: Measured soil temperature of 10.5° C. at 50 cm.

Described and sampled by: G.W. Hudelson, W.C. Lynn, W.E. McKinzie, G.B. Lee, R.L. Newbury, S.W. Payne, and A.J. Klingelhoets. Sampled from pit to 40 inches and peat sampler below 40 inches.

Not sampled: 5 to 0 cm. Mat of moss and roots;

011 741291-0 to 8 cm 741292-0 to 12 cm Depth below 0 500 2/23 1985 11-1 1 5 10000 2/23

SOIL Hibbing taxadjunctSOIL Nos. S64WI-2-1LOCATION Ashland County, WisconsinSOIL SURVEY LABORATORY Lincoln, NebraskaLAB. Nos. 19829-19837

June, 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)												3A1				Coarse fragments 2A2			
		Total			Sand						Silt		Int. II (0.2-0.02)	(2-0.1)	<0.074	0.005-0.002	Coarse fragments 2A2				
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (= 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02	Int. III (0.02-0.002)	3B2 Vol.					3B1 Wt.				
		A	B	C	D	E	F	G	H	I	J	19-2					19-2				
Pct. of < 2 mm																					
0-2	A1	31.5	52.4	16.1	0.6	3.5	6.2	13.4	7.8	15.7	36.7	30.5	23.7	72.8	11.6					tr	
2-5	A2	31.6	52.0	16.4	1.6	3.9	5.8	12.6	7.7	14.8	37.2	29.2	23.9	72.8	13.3					tr	
5-10	A&B	27.7	46.6	25.7	1.2	3.2	5.0	11.3	7.0	12.6	34.0	25.6	20.7	76.3	12.9	3				5	
10-15	B21t	17.5	34.4	48.1	0.6	1.4	2.9	7.4	5.2	9.8	24.6	19.1	12.3	85.6	10.8					tr	
15-23	B22t	17.1	34.6	48.3	0.4	1.5	2.8	7.1	5.3	10.0	24.6	19.2	11.8	10.1					tr		
23-30	B3	16.0	35.6	48.4	0.7	1.3	2.6	6.6	4.8	8.9	26.7	17.4	11.2	86.8	10.8					tr	
30-44	C1ca	12.6	34.8	52.6	0.5	1.4	2.0	4.9	3.8	7.7	27.1	14.2	8.8	89.6	11.8					tr	
44-55	C2	17.4	34.2	48.4	0.8	1.7	3.2	7.3	4.4	7.6	26.6	16.0	13.0	85.0	11.7					tr	
55-65	C3	17.7	36.2	46.1	0.7	1.6	3.1	7.5	4.8	8.6	27.6	17.4	12.9	85.0	11.9					tr	
Depth (in.)	6A1a Organic carbon b	6B1a Nitrogen	C/N	Carbonate as CaCO3		3A1a Non- Carbon- ate Clay Pct.	Bulk density			4D1 COLE	Water content				3A1b Fine Clay Pct.	8C1b Sat. Paste (1:1)	pH	8C1a (1:1)			
				6E1b 6E2a <2mm Pct.	3A1a <0.002 mm Pct.		4A1a Field- State g/cc	4A1d 1/3- Bar g/cc	4A1b Air- Dry g/cc		4B4 Field- State Pct.	4B1c 1/3- Bar Pct.	4B2 15- Bar Pct.	4C1 15-Bar 15- Bar in./in.							
				Pct.	Pct.																
0-2	3.17	0.175	18			16	1.14	1.14	1.17	0.010	33.1	25.6	7.0	0.21				5.6			
2-5	0.83	0.059	14			16		1.3c					5.0					5.2			
5-10	0.50	0.042	12			26	1.84	1.82	1.83	0.003	13.5	13.7	7.2	0.12				5.3			
10-15	0.36	0.045	8			48	1.59	1.47	1.77	0.064	21.0	24.7	14.5	0.13				5.1			
15-23	0.10			-(s)		48	1.71	1.58	1.81	0.047	16.9	21.0	14.7	0.10	20.6			6.7			
23-30	0.08			4	1	47	1.69	1.59	1.78	0.040	18.4	22.1	15.3	0.11				7.9			
30-44	0.12				5	48	1.74	1.69	1.82	0.024	18.1	19.4	15.6	0.06		7.4		8.3			
44-55	0.09				6	42	1.72	1.67	1.83	0.032	19.9	20.9	15.0	0.10				8.5			
55-65	0.08				6	40	1.72	1.72	1.84	0.024	21.0	20.2	13.4	0.12				8.6			
Depth (in.)	Extractable bases				5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap.		6G1d Ext. Iron as Fe Pct.	6C2a Ext. Iron as Fe Pct.	8E1 Resis- tivity ohms- cm.	8B1a Elec. Cond. mmhos/ cm.	8B Water at Sat. Pct.	8D5 Est. Total Salt in Soil ppm.	8D3 Ca/Mg	Base saturation					
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K			5A3a Sum	5A1a NH4OAc								5C3 Sum	5C1 NH4OAc				
																Pct.	Pct.				
0-2	8.1	2.5	tr	0.3	10.9	8.3	19.2	13.5	0.1	0.6						3.2	57				
2-5	2.5	1.1	tr	0.1	3.7	6.4	10.1	7.5	0.7	0.9						2.3	37				
5-10	3.6	2.3	tr	0.2	6.1	8.5	14.6	10.0	1.0	1.1						1.6	42				
10-15	10.4	7.8	0.1	0.5	18.8	7.5	26.3	22.0	1.1	1.4						1.3	71				
15-23	14.1	9.8	0.1	0.4	24.4	4.0	28.4	23.9		1.3						1.4	86				
23-30	14.1d	8.0e	0.2	0.4	22.7			20.4		1.3						1.8					
30-44	13.5d	6.5e	0.2	0.4	20.6			17.1		1.0		2,600	0.35	54.5	220	2.1					
44-55	10.5d	6.9e	0.2	0.4	18.0			14.3		1.0						1.5					
55-65	8.6d	7.5e	0.2	0.4	16.7			13.1		1.0						1.1					
Depth (in.)	Ratios to Clay 8D2			8D2																	
	NH4OAc	Ext.	15-Bar																		
	CEC	Iron	Water																		
0-2	0.84	0.04	0.44																		
2-5	0.47	0.05	0.31																		
5-10	0.38	0.04	0.28																		
10-15	0.46	0.03	0.30																		
15-23	0.50	0.03	0.30																		
23-30	0.43	0.03	0.33																		
30-44	0.36	0.02	0.33																		
44-55	0.34	0.02	0.36																		
55-65	0.33	0.03	0.34																		
a. Fe-Mn nodules comprise 50 to 60 percent of the very coarse sand above 23 inches. Carbonate comprises about 5 percent of the total sand below 23 inches.																					
b. 6 kg/m ² to 60 inches (Method 6A).																					
c. Estimated.																					
d. KCl-TEA extraction (Method 6N4b).																					
e. KCl-TEA extraction (Method 6O4b).																					

- a. Fe-Mn nodules comprise 50 to 60 percent of the very coarse sand above 23 inches. Carbonate comprises about 5 percent of the total sand below 23 inches.
- b. 6 kg/m² to 60 inches (Method 6A).
- c. Estimated.
- d. KCl-TEA extraction (Method 6N4b).
- e. KCl-TEA extraction (Method 6Q4b).

Soil classification: Typic Glosoboralf; fine, mixed.

Soil: Hibbing taxadjunct*.

Soil No.: 864WI-2-1.

Location: Ashland County, Wisconsin; NE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 6, T. 46 N., R. 4 W; 130 feet south of Highway 112 and 150 feet west of Highway 118.

Climate: Humid continental; mean annual temperature ranges from 38° to 44° F; mean annual precipitation ranges from 26 to 30 inches; and frost-free season is about 10 days.

Vegetation and land use: Native vegetation was mixed hardwood and pine forest with bracken fern, blueberry, hazelnut, rose, grasses, and weeds in the lower story vegetative cover and spruce, pine, elm, oak, and aspen in the upper story. Some large areas have been cleared and used for general farming.

Parent material: Calcareous clay glacial till.

Physiography: Gently sloping or undulating to hilly glacial till plain

Topography: Site is on a 2 percent convex slope with a west aspect.

Drainage: Moderately well and well drained.

Ground water: Deep.

Erosion: Slight

Permeability: Slow.

Described by: A.J. Klingelhoets, August 24, 1964.

(Colors are for moist soils unless otherwise stated)

A1 19829 0 to 5 cm (0 to 2 inches). Very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; many fine grass and tree roots; medium acid; clear wavy boundary. (A thin 1/4-inch mat of leaves, needles, and grass occurs on the surface at this site but was not sampled.)

A2 19830 5 to 13 cm (2 to 5 inches). Reddish gray (5YR 5/2) silt loam; moderate medium platy structure; friable; many fine roots; many earthworm holes and casts of A1; medium acid; clear wavy boundary.

A&B 19831 13 to 25 cm (5 to 10 inches). Reddish gray (5YR 5/2) silt loam A2; weak medium platy structure; friable; tonguing down into reddish and dark reddish brown (5YR 4/4 and 3/4) silty clay B2 having weak medium columnar structure which parts to moderate medium subangular blocks; very firm; isolated peds of B2 in the upper portion; few fine pebbles; many roots; some earthworm holes; medium acid; clear irregular boundary.

B2t 19832 25 to 38 cm (10 to 15 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium angular and subangular blocks; very firm, plastic, sticky; coatings of reddish gray (5YR 5/2) uncoated silt on vertical faces of prisms; thin continuous clay films on faces of peds; few fine pebbles; many roots; medium acid; gradual wavy boundary.

B22t 19833 38 to 58 cm (15 to 23 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium angular and subangular blocks; very firm, plastic, sticky; thin continuous clay films on faces of peds; roots common; few fine pebbles; slightly acid; gradual wavy boundary.

B3 19834 58 to 75 cm (23 to 30 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium angular and subangular blocks; very firm, plastic, sticky; thin continuous clay films; few dark reddish brown (5YR 3/2) organic stains on vertical faces of prisms; few roots and fine pebbles; mildly alkaline; gradual wavy boundary.

C1ca 19835 75 to 100 cm (30 to 40 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium subangular blocks; very firm; plastic, sticky; thick clay films and pinkish gray (5YR 7/2) lime coatings on pressure faces (slickensides); many pinkish gray (5YR 6/2 and 7/2) soft lime segregations less than 5 mm in diameter; few roots and fine pebbles; strong effervescence; clear wavy boundary.

C2 19836 100 to 138 cm (40 to 55 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium blocks; very firm, plastic, sticky; thick clay films and pinkish gray (7.5YR 7/2) lime coatings on pressure faces (slickensides); few fine roots and pebbles; discontinuous thin (3/4-inch) loam lens occurs at top of this horizon; strong effervescence; clear irregular boundary.

C3 19837 138 to 163 cm (55 to 65 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to weak coarse subangular blocks; very firm, plastic, sticky; thick clay films and pinkish gray (7.5YR 6/2 and 7/2) lime coatings on pressure faces (slickensides); few roots to 60 inches; strong effervescence.

Remarks: Few stones and pebbles occur throughout the profile. Sand content of B and C horizons was estimated at 15 percent.

Soil temperatures:	Depth (inches)	Temperature
	20	14° C.
	30	14° C.
	40	13° C.

*This pedon has lower base saturation in portions of the argillic horizon than that required for the Hibbing series.

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)											3A1				Coarse fragments 2A2	
		Total			Sand						Silt		2-0.1	<0.074	0.005-0.002	3B1		
		Sand (2-0.05) %	Silt (0.05-0.002)	Clay (≤ 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02 (0.02-0.002)	Int. III (0.02-0.002)	Int. II (0.2-0.02)				Vol. 19-2	Wt. 19-2	
																		Pct. of ≤ 2 mm		Pct. of 19-2
0-2	A1	23.1	59.3	17.6	0.5	2.8	4.8	9.7	5.3	15.5	43.8	25.5	17.8	79.8	14.8		1	
2-4	A2	16.6	65.4	18.0	0.6	1.6	3.5	6.7	4.2	10.9	54.5	18.5	12.4	85.9	21.1		1	
4-7	A&B	12.9	52.7	34.4	0.4	1.4	2.7	5.1	3.3	7.9	44.8	13.8	9.6	89.0	18.4		tr	
7-13	B21t	15.3	35.6	49.1	0.7	1.5	3.0	6.2	3.9	6.6	29.0	13.7	11.4	86.9	14.2		tr	
13-21	B22t	13.9	31.3	54.8	0.2	1.5	2.7	5.8	3.7	6.8	24.5	13.7	10.2		11.2		tr	
21-27	B3	16.8	38.0	45.2	0.9	1.9	3.2	6.7	4.1	7.0	31.0	14.6	12.7	85.6	16.2		tr	
27-37	C1ca	15.3	38.3	46.4	0.5	1.8	3.1	6.2	3.7	6.4	31.9	13.3	11.6	86.8	16.9		2	
37-50	C2	14.8	37.5	47.7	1.1	1.7	2.8	5.7	3.5	6.3	31.2	12.9	11.3	87.2	16.9		2	
50-60	C3	13.8	37.0	49.2	0.7	1.5	2.7	5.5	3.4	6.7	30.3	13.1	10.4	88.2	15.2		tr	

Depth (in.)	6A1a Organic carbon Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃		3A1a Non-Carbonate Clay Pct.	Bulk density			4D1 COLE	Water content				pH	8C1a (1:1)
				6E1b 6E2a 2mm Pct.	3A1a Carbonate mm Pct.		4A1a Field- State g/cc	4A1d 1/3- Bar g/cc	4A1b Air- Dry g/cc		4B4 Field- State Pct.	4B1c 1/3- Bar Pct.	4B2 15- Bar Pct.	4C1 1/3-to 15-Bar in./in.		
0-2	6.43	0.437	15			18										6.1
2-4	0.60	0.058	10			18	1.70	1.70	1.70	-	18.7	18.0	4.2	0.23		6.1
4-7	0.59					34	1.74	1.74	1.76	0.003	17.3	17.0	9.6	0.13		6.2
7-13	0.44			(s)		49	1.59	1.61	1.78	0.036	21.7	19.8	14.4	0.09		6.2
13-21	0.30			tr(s)	-	55	1.61	1.52	1.74	0.047	20.2	23.2	16.0	0.11		7.0
21-27	0.08			12	3	42	1.74	1.69	1.82	0.024	16.9	18.7	14.0	0.08		8.2
27-37	0.07			15	4	42	1.74	1.67	1.83	0.032	18.5	20.1	14.1	0.10		8.3
37-50	0.08			17	6	42	1.81	1.76	1.86	0.017	17.6	18.7	15.5	0.06		8.3
50-60	0.08			16	6	43	1.74	1.69	1.84	0.028	19.9	21.2	16.0	0.09		8.5

Depth (in.)	Extractable bases					5B1a Sum	6H1a Ext. Acidity	Cat. Exch. Cap. 5A3a Sum	6G1d KCl- Ext. Al	6C2a Ext. Iron as Fe Pct.	8D3 Ca/Mg	Base saturation	
	6N2a Ca	6O2a Mg	6P2a Na	6Q2a K	5C1 Sum Cations							5C1 NH ₄ OAc CEC	
0-2	17.0	4.9	0.1	0.4	22.4	9.3	31.7	22.5		0.6	3.5	71	100
2-4	4.3	2.0	0.1	0.1	6.5	4.3	10.8	7.6		0.8	2.2	60	86
4-7	7.4	3.9	0.1	0.2	11.6	6.1	17.7	13.3		1.3	1.9	66	87
7-13	12.5	6.9	0.2	0.4	20.0	6.8	26.8	21.3		1.4	1.8	75	94
13-21	15.8b	8.6c	0.2	0.5	25.1	3.6	28.7	25.6		1.4	1.8	87	98
21-27	12.6b	5.6c	0.2	0.3	19.7			17.1		1.3	2.4		
27-37	12.5b	5.6c	0.2	0.3	18.6			15.0		1.0	2.2		
37-50	10.8b	6.3c	0.2	0.3	17.6			13.6		1.1	1.7		
50-60	9.9b	7.2c	0.2	0.4	17.7			13.8		1.0	1.4		

Depth (in.)	Ratios to Clay 8D2				
	NH ₄ OAc CEC	Ext. Iron	15-Bar Water		
0-2	1.25	0.03	0.73		
2-4	0.42	0.04	0.23		
4-7	0.39	0.04	0.28		
7-13	0.43	0.03	0.29		
13-21	0.47	0.03	0.29		
21-27	0.41	0.03	0.33		
27-37	0.36	0.02	0.34		
37-50	0.32	0.03	0.37		
50-60	0.32	0.02	0.37		

a. Carbonate comprises about 5 percent of the sands below 21 inches.

b. KCl-TEA extraction (Method 6N4b).

c. KCl-TEA extraction (Method 6O4b).

Soil classification: Glossic Entroborsalf; fine, mixed.

Soil: Hibbing taxadjunct*.

Soil No.: S64WI-4-1.

Location: Bayfield County, Wisconsin; SW $\frac{1}{4}$, Sec. 16, T. 47 N., R. 5 W.; 130 feet north and 120 feet east of section corner.

Climate: Humid continental; mean annual temperature ranges from 38° to 44° F; mean annual precipitation ranges from 26 to 30 inches; and frost-free season is about 109 days.

Vegetation and land use: Native vegetation was pine and spruce forests with bracken fern, wild strawberry, hazelnut, grasses, and weeds in lower story vegetative cover, and spruce, pine, aspen, birch, and cherry in upper story. Some areas have been cleared and are being used for general farming.

Parent material: Calcareous clay glacial till.

Physiography: Gently sloping in undulating to hilly glacial till plain.

Topography: Site is in a 1 percent east facing slope.

Drainage: Moderately well to well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Slow.

Described by: A.J. Klingelhoets, August 24, 1964.

(Colors are for moist soil unless otherwise noted)

A1 19838 0 to 5 cm (0 to 2 inches). Very dark gray (10YR 3/1) silt loam; moderate medium granular structure; friable; many fine grass and tree roots; slightly acid; clear wavy boundary.

A2 19839 5 to 10 cm (2 to 4 inches). Reddish gray (5YR 5/2) silt loam; weak to moderate medium platy structure; friable; many fine roots; many earthworm holes and casts of A1; slightly acid; clear irregular boundary.

A&B 19840 10 to 18 cm (4 to 7 inches). Dark reddish gray (5YR 4/2) silt loam A2; weak medium platy structure; friable; tonguing of A2 down into reddish brown (2.5YR 4/4) silty clay B2; B2 has moderate medium columnar structure that parts to moderate medium subangular blocks; very firm; isolated peds of B2 in the upper portion; few small pebbles; many roots; some earthworm holes; medium acid; gradual irregular boundary.

B21t 19841 18 to 33 cm (7 to 13 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium angular blocks; very firm, plastic, sticky; thick coatings of dark reddish gray (5YR 4/2) clean silt coatings on the vertical faces of prisms; thin continuous clay films on faces of peds; few small pebbles; roots common; slightly to medium acid; gradual wavy boundary.

B22t 19842 33 to 53 cm (13 to 21 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium angular blocks; very firm, plastic, sticky; thin continuous clay films; few dark reddish brown (5YR 3/2) organic stains along vertical cracks and root channels; few small pebbles; roots common; slightly to medium acid; gradual wavy boundary.

B3 19843 53 to 68 cm (21 to 27 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium angular and subangular blocks; very firm, plastic, sticky; thin continuous clay films; few roots; few small pebbles; mildly alkaline; gradual wavy boundary.

Clca 19844 68 to 93 cm (27 to 37 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to moderate medium subangular blocks; very firm, plastic, sticky; thick clay films and pinkish gray (7.5YR 6/2) and light gray (10YR 7/2) lime coatings on pressure faces (slickensides); many pinkish gray (5YR 6/2) soft lime segregations less than 5 mm in diameter; few small pebbles; strong effervescence; clear wavy boundary.

C2 19845 93 to 125 cm (37 to 50 inches). Reddish brown (2.5YR 4/4) clay; moderate coarse prismatic structure parting to weak coarse subangular blocks; very firm, plastic, sticky; thick clay films and pinkish gray (7.5YR 6/2) and light gray (10YR 7/2) lime coatings on pressure faces (slickensides); few small pebbles; strong effervescence; clear irregular boundary.

C3 19846 125 to 150 cm (50 to 60 inches). Reddish brown (2.5YR to 5YR 4/4) clay; moderate coarse prismatic structure parting to weak coarse subangular blocks; very firm, plastic, sticky; thick clay films and pinkish gray (7.5YR 6/2) and light gray (10YR 7/2) lime coatings on pressure faces (slickensides); few fine pebbles; strong effervescence; clear irregular boundary.

*This pedon is a taxadjunct to the Hibbing series because it has tongues of bleached material invading the top of the subsoil clay accumulation.

Remarks: Few stones and pebbles occur throughout the profile. Sand content of B and C horizons was estimated at 15 percent.

Soil temperatures:	Depth (inches)	Temperature
	20	15° C.
	20	14° C.
	40	13° C.

SOIL CLASSIFICATION-TYPIC ARGILLLOLL
FINE-LOAMY, MIXED, MESIC
SERIES - - - - -HOCHMEIM

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE MRTC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - S68W1-8-1 COUNTY - - - CALUMET

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 68L1066-68L1072

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -														RATIO
		SAND	SILT	CLAY	CLAY	VGCS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	INTR	
CM		2- .05	.05- .002	LT .002	LT .0002	1	1- .5	.5- .25	.25- .10	.10- .05	.05- .02	.02- .002	.002- .0005	SAND	2- .02	
		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-20	AP	27.5	55.4	17.1	7.9	1.3	2.6	4.6	10.8	8.2	29.3	26.1		19.3	43.3	46
020-36	B2T	26.5	49.7	23.8		.7	2.5	4.8	11.0	7.5	27.0	22.7		19.0	40.4	24
036-51	B3T	53.5	32.6	13.9		2.3	4.5	7.3	25.8	13.6	18.7	13.9		39.9	48.3	14
051-81	C1	58.8	33.4	7.8		4.0	5.1	7.8	26.4	15.5	19.9	13.5		43.3	52.1	8
081-104	C2	59.7	32.6	7.7	2.6	8.0	9.3	8.3	21.3	12.8	17.3	15.3		46.9	42.9	34
104-135	C3	49.4	41.8	8.8		4.0	5.7	5.9	19.8	14.0	22.6	19.2		35.4	49.0	9

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2 (- - - - -)														CARBONATE (- - - - -)	PH (- - - - -)
	VOL. (- - - - -)	GT	75-20	20-5	5-2	LT	20-2	1/3- OVEN	COLE	1/10	1/3- WRD	15- WRD	CM/	6E1B	3A1A	
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-20	5	0	5	TR	TR	75	2	1.57	1.67	.020		20.9	7.4	.20	3	0
020-36	5	0	5	TR	TR	75	1	1.52	1.65	.026		21.8	9.5	.18	2	0
036-51	15	10	10	5	5	45	8	1.60A				5.3			27	0
051-81	25	5	10	15	5	35	23	1.72	1.73	.002	10.4	2.8	.10		44	0
081-104	25	5	10	15	5	35	20	1.76	1.79	.004	13.3	3.1	.13		51	0
104-135	30	5	10	25	5	35	31	1.84	1.89	.006	12.8	3.2	.12		55	0
135-163	30	5	10	20	5	40	26	1.80A				3.8			60	0

DEPTH	ORGANIC MATTER (- - - - -)														RATIO	RATIO
	6A1A	6B1A	C/N	6C2A	6S1A	6N2E	6O2D	6P2A	6Q2A	SUM	6H1A	6C1D	6A3A	6A6A		
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-20	1.59B	.147	11	101	10.4C	4.4C	0.1	0.1	15.0				15.2	0.89	2.4	
020-36	0.54	.057	9	106	11.4C	5.6C	0.1	0.1	17.2				16.0	0.67	2.0	
036-51	0.31	.031	10	0.8	6.8C	2.7C	0.1	0.1	9.7				8.6	0.62	2.5	
051-81	0.19			0.5	3.6C	1.5C	0.1	TR	5.2				4.1	0.53	2.4	
081-104	0.13			0.4	2.7C	1.4C	0.1	TR	4.2				3.4	0.44	1.9	
104-135	0.09			0.3	2.4C	1.3C	0.1	TR	3.8				3.1	0.35	1.8	
135-163	0.06			0.2	2.2C	1.3C	0.1	TR	3.6				2.8	0.27	1.7	

DEPTH	SATURATED PASTE (- - - - -)														ATTENBERG	ATTENBERG
	8E1	8C1B	8A	5D2	5E	TOTL	SOLU	MMHOS/	CA	MG	NA	K	CO3	MG		
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-20															300	7
020-36															310	12
036-51																
051-81																
081-104	8300	7.9	28.5			70		0.39								
104-135																
135-163																

CLAY MINERALOGY (7A2C).

020-36 P12 MV2 KK2 MT1.

COMMENTS - THE MONTMORILLONITE-VERMICULITE MIXTURE CONTAINS SOME INTERLAYER MATERIAL. BY INFERENCE, A CONSIDERABLE AMORPHOUS COMPONENT IS PRESENT. CLAY MINERALOGY IS MIXED.

RELATIVE AMOUNTS - (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.

MINERAL CODE - MT = MONTMORILLONITE MI = MICA KK = KAOLINITE MV = MONTMORILLONITE-VERMICULITE.

(A) ESTIMATED.

(B) ORGANIC CARBON IS B KG PER SQ M TO A DEPTH OF 1 METER (METHOD 6A1).

(C) METHODS 6N4C FOR CA AND 6O4C FOR MG.

(D) LL AND PI BY SOIL MECHANICS LAB, USDA-SCS, LINCOLN, NE.

Soil classification: Typic Argiudolls; fine-loamy, mixed, mesic.

Soil: Hochheim.

Soil No.: S68WI-8-1.

Location: Calumet County, Wisconsin; SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 11, T. 17 N., R. 20 E.; 90 feet east of lot line and 900 feet north of barn.

Climate: The climate is humid continental. Mean annual temperature is about 47° F; mean annual precipitation is approximately 30 inches; and frost-free season is about 135 days.

Vegetation and land use: Native vegetation was principally maple-basswood forest. Much of this soil is used for growing general farm crops.

Parent material: Highly calcareous light loam to sandy loam glacial till with very thin loess mantle.

Physiography: Gently sloping to steep sides of drumlins and glacial ground moraine.

Topography: Near the top of a large drumlin. Site is on a 10 percent convex slope with east aspect.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight to moderate.

Permeability: Moderate.

Described by: A. Klingelhoets, R. Fox, and E. Link, August 19, 1968.

(Colors are for moist conditions unless otherwise stated)

A_p 68L1066 0 to 20 cm (0 to 8 inches). Very dark grayish brown (10YR 3/2) gritty silt loam, grayish brown (10YR 5/2) dry; weak coarse plates parting to moderate very fine subangular blocks; friable; roots common; stones 3/4 to 3 inches in diameter constitute 3 percent of the volume; moderately alkaline; abrupt smooth boundary.

B_{2t} 68L1067 20 to 36 cm (8 to 14 inches). Dark yellowish brown (10YR 4/4) light clay loam; moderate medium and fine subangular blocky structure; hard when dry, slightly plastic when wet; thick patchy clay films with dark brown (7.5YR 3/2) colors; roots common; 3 percent of the volume is composed of rocks 3/4 to 3 inches in diameter; moderately alkaline; clear wavy boundary.

B_{3t} 68L1068 36 to 51 cm (14 to 20 inches). Dark yellowish brown (10YR 4/4) with inclusions of yellowish brown (10YR 5/4) loam; weak medium and moderate fine subangular blocky structure; firm when moist; few thin patchy clay films; many partly weathered dolomite rocks and pebbles; 6 percent of volume is composed of rocks 3/4 to 3 inches in diameter and 5 percent of rocks over 3 inches in diameter; roots common; moderately alkaline with areas that contain free carbonates; gradual irregular boundary.

C₁ 68L1069 51 to 81 cm (20 to 32 inches). Yellowish brown (10YR 5/4) light loam or sandy loam; weak medium fragmental blocks; friable; few roots; 6 percent of volume is composed of rocks 3/4 to 3 inches in diameter and 5 percent of rocks over 3 inches in diameter; 90 percent of the rocks are dolomite; strong effervescence; gradual wavy boundary.

C₂ 68L1070 81 to 104 cm (32 to 41 inches). Characteristics are the same as horizon above, except for the presence of a few fine flecks of secondary carbonates.

C₃ 68L1071 104 to 135 cm (41 to 53 inches). Light yellowish brown (10YR 5/4) light loam; weak medium fragmental blocks; friable; few fine faint mottles of yellowish brown and dark yellowish brown (10YR 5/6 and 4/4); 6 percent of volume is composed of rocks 3/4 to 3 inches in diameter and 5 percent of rocks over 3 inches in diameter; 90 percent of the rocks are dolomite; strong effervescence; gradual wavy boundary.

C₄ 68L1072 135 to 163 cm (53 to 64 inches). Pale brown (10YR 6/3) light loam; weak fine fragmental structure; friable; 6 percent of volume is composed of rocks 3/4 to 3 inches in diameter and 5 percent of rocks over 3 inches in diameter; 90 percent of rocks are dolomite; strong effervescence.

Remarks: Soil nearly dry in solum and moist in substratum when sampled. The glacial till appears to have a very high carbonate content. Approximately 80 percent of the pebbles and rocks in the till are dolomite.

Soil temperature: At 10 inches - 23° C.
20 inches - 21° C.
40 inches - 18.5° C.

SOIL CLASSIFICATION-TYPIC ARGIUOOLL
FINE-LOAMY, MIXED, MESIC
SERIES - - - - -HOCHHEIM

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE NRTSC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - S68W1-8-2 COUNTY - - - CALUMET

GENERAL METHODS- - -1A,1B1B,2A1,2B SAMPLE NOS. 68L1073-68L1079

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -)RATIO														
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	INTR	FINE
		2- .05	.05- .002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2- .1	.02	CLAY
CM		(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -	(- - - - -
		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-10	AP	38.0	44.6	17.4		3.9	6.1	6.2	13.8	8.0	17.5	27.1		30.0	33.0	17 .52
010-18	A3	38.2	44.0	17.8		4.8	6.9	6.1	12.7	7.7	17.4	26.6		30.5	32.1	18 .43
018-38	B2T	33.4	34.1	32.5		3.2	4.1	5.0	12.9	8.2	14.0	20.1		25.2	29.9	33 .34
038-56	B3T	46.6	34.8	18.6		3.6	4.7	5.8	19.2	13.3	18.6	16.2		33.3	43.6	19 .34
056-84	C1	47.4	38.0	14.6		5.5	5.9	6.2	17.7	12.1	19.4	18.6		35.3	42.0	15 .38
084-119	C2	45.3	40.4	14.3		4.0	4.5	5.7	18.0	13.1	19.8	20.6		32.2	43.8	12 .37
119-152	C3	46.2	39.4	14.4		5.3	5.4	5.9	17.2	12.4	19.0	20.4		33.8	41.7	9 .38

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2)(BULK DENSITY)(- - - - -WATER CONTENT- - - - -) CARBONATE (- -PH - -)										(- -PH - -)						
	VOL. 1- - - - - WEIGHT - - - - -					4A1D 4A1H 4D1 4B1C 4B1C 4B2 4C1					6E1B 3A1A		8C1A 8C1E				
	GT	75	20-20	5-5	LT	20-2	1/3-1/3	OVEN COLE	1/10	1/3-1/3	15-15	WRD		LT	LT	1/1	1/2
	2	75				.074	PCT	BAR	DRY	BAR	BAR	BAR	CM/	2	.002	H2O	CAC.
CM	PCT	PCT	(- - - - -	PCT	LT	75	(- - - - -	LT20	G/CC	G/CC	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-10	2	0	0	2	1	64	3	1.21	1.35	.036		25.3	9.0	.19		1	0 7.3 6.8
010-18	TR	0	5	TR	TR	65	1	1.30A				7.6			TR	0	7.4 6.7
018-38	5	0	5	5	TR	65	5	1.50	1.68	.037		19.0	11.2	.11	11	0	7.6 7.1
038-56	20	5	10	10	5	45	17	1.60A				6.4			41	TR	8.0 7.2
056-84	30	15	10	10	10	40	21	1.77	1.83	.008		11.4	5.6	.07	50	TR	8.1 7.3
084-119	25	10	5	15	5	45	21	1.86	1.92	.008		11.1	5.3	.08	54	2	8.2 7.4
119-152	20	5	5	15	5	45	21	1.86	1.98	.017		10.9	5.5	.08	56	5	8.4 7.6

DEPTH (ORGANIC MATTER)		IRON	PHOS	(- -EXTRACTABLE BASES 5B4A- -)					ACTY	AL	(CAT EXCH)	RATIO	RATIO	CA	(BASE SAT)		
6A1A	6B1A	C/N	6C2A	6S1A	6N2E	6O2D	6P2A	6Q2A	6H1A	6G1D	5A3A	5A6A	8D1	8D3	5F	5C3	5C1
ORGN	NITG		EXT	TOTL	CA	MG	NA	K	BACL	KCL	EXTB	NHAC	NHAC		SAT	EXTB	NHAC
CARB			FE								TEA	EXT	ACTY	TO		ACTY	
CM	PCT	PCT	PCT	PCT	(- - - - -	-MEQ	/ 100	G- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	CLAY	MG	PCT	PCT	PCT
000-10	3.108		1.2		11.7C	4.4C	0.1	0.1	16.3				20.2	1.16	2.7		
010-18	1.32		1.2		10.1C	3.4C	0.1	0.1	13.7				14.7	0.83	3.0		
018-38	0.80		1.5		12.2C	5.3C	0.1	0.3	17.9				17.7	0.54	2.3		
038-56	0.43		0.6		6.6C	2.9C	0.1	0.2	9.8				8.8	0.47	2.3		
056-84	0.22		0.4		3.9C	2.1C	0.1	0.1	6.2				5.9	0.40	1.9		
084-119	0.16		0.4		3.5C	2.0C	0.1	0.1	5.7				5.0	0.35	1.8		
119-152	0.13		0.3		6.3C	1.7C	0.1	0.1	8.2				4.1	0.28	3.7		

(A) ESTIMATED.
(B) ORGANIC CARBON IS 10 KG PER SQ M TO A DEPTH OF 1 METER (METHOD 6A).
(C) METHODS 6N4C FOR CA AND 6O4C FOR MG.

Soil classification: Typic Argiudolls; fine-loamy, mixed, mesic.

Soil: Hochheim.

Soil No.: S68WI-8-2.

Location: Calumet County, Wisconsin. NW 1/4 Sec 7 T 17 N R. 70. E. 120 feet south of the road and 40 feet

east of fence line.

Climate: The climate is humid continental. Mean annual temperature is about 47° F; mean annual precipitation is approximately 30 inches; and frost-free season is about 135 days.

Vegetation and land use: Native vegetation was primarily maple-basswood forest. Much of this soil is used for growing general farm crops.

Parent material: Highly calcareous light loam glacial till with a very thin loess mantle.

Physiography: Gently sloping to steep side slopes of drumlins and glacial ground moraine.

Topography: Near the top of a large drumlin. Site is on an 8 percent convex slope with a southwest aspect.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: R. Fox and E. Link, Aug. 19, 1968

(Colors are for moist soil unless otherwise noted)

Ap 68L1073 0 to 10 cm (0 to 4 inches). Very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; roots common; moderately alkaline; abrupt smooth boundary.

A3 68L1074 10 to 18 cm (4 to 7 inches). Dark brown (10YR 3/3) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; friable; evidence of an A2 exists in pockets near the lower boundary with dark grayish brown (10YR 4/2) colors and moderate medium platy structure; roots common; about 1 percent of volume composed of gravel 3/4 to 3 inches in diameter; moderately alkaline; clear wavy boundary.

B2t 68L1075 18 to 38 cm (7 to 15 inches). Dark brown (7.5YR 4/4) clay loam, reddish brown (5YR 4/3) dry; moderate fine subangular blocky structure; slightly plastic when wet and hard when dry; thick patchy clay films with dark brown (7.5YR 4/2) colors; roots common; approximately 3 percent of volume composed of gravel, 3/4 to 3 inches in diameter; moderately alkaline; gradual wavy boundary.

B3t 68L1076 38 to 56 cm (15 to 22 inches). Dark brown (7.5YR 4/4) loam, dark brown (7.5YR 4/2) crushed; weak fine subangular blocky structure; friable; roots common; few thin patchy clay films; approximately 8 percent of volume composed of stones 3/4 to 3 inches in diameter and 5 percent of stones over 3 inches in diameter; moderately alkaline with free carbonates in the lower part; gradual irregular boundary.

C1 68L1077 56 to 84 cm (22 to 33 inches). Brown (7.5YR 5/4) loam; weak fine fragmental blocks; friable; few roots; 5 percent of volume composed of stones 3/4 to 3 inches in diameter and 10 percent of stones over 3 inches in diameter; 80 percent of stones are dolomite; strong effervescence; gradual wavy boundary.

C2 68L1078 84 to 119 cm (33 to 47 inches). Characteristics are the same as for horizon above except for some evidence of weak coarse platy structure along with the fragmental blocks and 3 percent of volume being composed of stones 3/4 to 3 inches in diameter and 6 percent of stones over 3 inches in diameter.

C3 68L1079 119 to 152 cm (47 to 60 inches). Yellowish brown (10YR 5/4) light loam; weak coarse plates parting to weak fine fragmental blocks; friable; few scattered roots; 3 percent of volume composed of stones 3/4 to 3 inches in diameter and 4 percent of volume of stones over 3 inches in diameter; strong effervescence.

Remarks: Soil nearly dry in solum but moist in substratum when sampled. The glacial till appears to have a very high carbonate content. Most of the pebbles and stones are of dolomite (estimated 80 percent). Evidence of an A2 horizon occurs in scattered areas but this is destroyed after a few cultivations.

Soil temperature: At 10 inches - 19° C.
20 inches - 17.5° C.
40 inches - 16.5° C.

SOIL CLASSIFICATION-TYPIC MEDISAPRIST

EVIC, MESIC
SERIES - - - - -HOUGHTON

SOIL NO - - - - - S74W1-25-1 COUNTY - - - DANE

GENERAL METHODS - - -1A,1B1B,2A1,2B

SAMPLE NOS. 74L1479-74L1482

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -)RATIO														
		SAND	SILT	CLAY	FINE (	VCOS	CORS	NEDS	FNES	VFNS	COSI	FNES	VFSL	SAND	INTR	FINE
		2-	.05-	LT	CLAY	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-
CH		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	TO
		PCT LT 2MM - - - - -) PCT PCT PCT PCT PCT PCT PCT PCT PCT PCT PCT PCT PCT PCT PCT														

000-25	0A1P1															
033-43	0A3															
043-109	0A4															
109-152	0A5	5.7	66.1	28.2			TR	TR	.5	2.4	2.8	24.2	41.9		2.9	3.29

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (BULK DENSITY) (- - -WATER CONTENT- - -) CARBONATE (- -PH - -)														
	VOL. (	WEIGHT	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2
	GT	GT	75-20	20-5	5-2	.074	PCT	BAR	DRY	BAR	BAR	CH/	2	.002	H2O
CH	PCT	PCT	(- - - PCT LT 75 - - -)	LT20	G/CC	G/CC	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	CACL
000-25	TR	0	0	0	TR	TR	.18	.71		564	459	81	.68		6.7
033-43	TR	0	0	0	TR	TR	.21	.78		472	388	113	.58		6.4
043-109	TR	0	0	0	TR	TR	.19	.66		527	388	122	.51		6.3
109-152	0	0	0	0	96	0						102			6.0

DEPTH	(ORGANIC MATTER) IRON PHOS (- -EXTRACTABLE BASES 5B4A- -) ACTY AL (CAT EXCH) RATIO RATIO CA (BASE SAT)														
	6A1A	6B1A	C/N	6C2B	EXT	TOTL	CA	HG	NA	K	SUM	EXTB	TRB	EXT	ACTY
	ORGN	WITG		FE							EXTB	TRB	EXT	ACTY	
CH	PCT	PCT		PCT	PCT	(- - - - -)	-HEQ	/ 100	G - - - - -)	CLAY	HG	PCT	PCT	PCT	PCT
000-25	29.0	2.94	10				118	39.1	.5	2.2	160	23.4		183	139
033-43	42.1	3.29	13				120	43.8	.4	.4	165	47.4		212	147
043-109	41.7	3.67	11				131	48.5	.5	.5	181	50.0		231	162
109-152	43.2	2.96	15				102	38.8	.4	.3	142	65.8		207	121

DEPTH	(SATURATED PASTE) NA NA SALT GYP (- - - - -) SATURATION EXTRACT 8A1- - - - -) ATTERBERG														
	8E1	8C1B	8A	5D2	5E	8D5	6P1A	8A1A	6W1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A
	REST	PH	H2O	HSP	SAR	TOTL	SOLV	BC	CA	HG	NA	K	CO3	HCO3	CL
CH	CH	PCT	PCT			PPH	PCT	CH	(- - - - -)	MEQ / LITER	- - - - -)	PCT	PCT	PCT	PCT
000-25	510	6.5	315			9200		3.45	24.5	18.3	.8	1.9	0	.9	6.7
033-43	1300	6.0	826			6400		1.16	6.3	5.4	.3	.1	0	.6	1.0
043-109	1300	6.0	841			7200		1.19	6.9	5.9	.3	.2	0	.3	1.0
109-152	950	5.4	587			7600		1.67	11.2	8.9	.2	TR	0	.3	16.8

DEPTH	(- - - - -) HISTOSOL CHARACTERIZATION - - - - -)														
	8F	8G	8H	8C1E	4A3A	4A1I	4D1	4B4	4B1C	4B2	4C1				
	MINI	(FIBER VOL)	PYROPHOSPT	.01N	FIELD	1/3B	BE-	RES-	FIELD	1/3B	15-	WRD			
CH	CH	PCT	PCT	PCT	(MUNS COLOR)	G/CC	G/CC	PCT	PCT	PCT	PCT	CH			
000-25	44	15	1	10 YR	2/2	6.8	.34	.32	.21	71	181	229	77	.49	
033-43	16	30	4	7.5YR	4/2	6.0	.18	.32	.15	84	450	229	108	.39	
043-109	16	30	8	7.5YR	4/2	6.0	.18	.32	.19	84	462	220	114	.34	
109-152	30	48	4	10 YR	6.5/3	5.7	.15			58	523		93		

Cell classification: Toxic Medicaments: Anti-medic

SOIL CLASSIFICATION-TYPIC MEDISAPRIST

BUC, MESIC

SERIES - - - - -HOUGHTON

SOIL NO - - - - - S74WI-55-2

COUNTY - - - JEFFERSON

GENERAL METHODS - - - 1A, 1B1B, 2A1, 2B

SAMPLE NOS. 74L1483-74L1488

U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE, NTSC

NATIONAL SOIL SURVEY LABORATORY

LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -) RATIO														
		SAND	SILT	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY	CLAY
		2-	.05-	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	.02
CM		PCT LT 2MM - - - - -) PCT														
000-28	0A1	3.5	71.2	25.3		.1	.1	.2	.8	2.3	23.7	47.5		1.2		3.81
028-62	0A2															
062-84	0A3															
084-109	0A4															
109-127	0A5															
127-183	0A6															

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2 (BULK DENSITY) (- - - - -) WATER CONTENT - - - - -) CARBONATE (- - - - -)														
	VOL. (- - - - -)	WT. (- - - - -)	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WED	LT
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WED	LT
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CH/	2
CM	PCT	PCT	PCT LT 75 - - - - -) LT20 G/CC G/CC PCT PCT PCT CM PCT PCT												
000-28	TR	0	0	0	TR	98	TR	.21	.89		459	371	112	.54	5.7
028-62	0	0	0	0	0	0	0	.17	.61		573	447	111	.57	5.7
062-84	0	0	0	0	0	0	0	.16	.50		571	418	110	.49	5.6
084-109	0	0	0	0	0	0	0	.20	.96		551	398	113	.57	5.2
109-127	TR	0	0	0	TR	TR	TR	.20	1.11		576	435	105	.66	4.9
127-183	TR	0	0	0	TR	TR	TR	.20	1.11		576	435	105	.66	4.9

DEPTH (ORGANIC MATTER) IRON PHOS (- - - EXTRACTABLE BASES 5B4A- -) ACTY AL (CAT EXCH) RATIO RATIO CA (BASE SAT)																
6A1A	6E1A	C/N	6C2B	6N2B	6O2D	6P2B	6Q2B	6H1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1
ORGN	HTG		EXT	TOTL	CA	MG	NA	K	BAEL	KCL	EXTB	NRAC	NRAC	CA	SAT	EXTB
CARB			FE						EXTB	TEA	EXT	ACTY		TO	TO	NRAC
CH	PCT	PCT	PCT	PCT	(- - - - -)	- - - - -	- - - - -	- - - - -	HEQ / 100	G- - - - -	- - - - -	- - - - -	- - - - -	CLAY	MG	PCT
000-28	36.5	3.60	10		110	27.4	.1	1.1	139	72.8		211	149		4.0	74
028-62	39.0	3.08	13		119	36.5	.2	.5	156	97.4		254	163		3.3	73
062-84	45.8	2.83	16		121	38.5	.3	.5	160	89.3		250	155		3.1	78
084-109	45.7	2.61	18		83.8	26.6	.3	.3	111	77.8		189	118		3.2	71
109-127	31.2	3.27	10		56.0	18.9	.3	.3	75.5	99.6		175	83.8		3.0	67
127-183	24.0	2.95	8		61.2	29.4	.3	.3	91.2	178		269	75.1		2.1	81

DEPTH	(SATURATED PASTE) NA NA SALT GYP (- - - - -) SATURATION EXTRACT 8A1- - - - -) ATTERBERG														
	8E1	8C1B	8A	5D2	5E	8D5	6P1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL
	ORH-					SOLN		HHHOS/							
CM	CM		PCT	PCT		PPH	PCT	CH	- - - - -) HEQ / LITER - - - - -) PCT						
000-28	1000	5.2	410			4300		1.59	9.7	5.8	.1	.7	0	.3	.2
028-62	1200	5.3	708			6100		1.25	7.8	5.3	.1	.2	0	.3	.0
062-84	1900	5.3	960			5200		.76	4.9	3.3	.1	.1	0	.9	.2
084-109	1700	5.2	968			5900		.88	5.5	3.8	.1	.1	0	.9	.0
109-127	570	3.9	862			24000		3.13	28.5	15.1	.2	.1	0	.0	.5
127-183	250	2.3	809			30000		6.17		33.8	.2	.1	0	.0	2.5

DEPTH	(STATE OF DECOMPOSITION) PH (BULK DEN) COLE SUBS (- - - - -) WATER CONTENT - - -)														
	8F	8G	8H	8C1E	4A3A	4A1I	4D1	4B4	4B1C	4B2	4C1				
	HWL (FIBER VOL)	PYROMOSPH	.01H	FILD	1/3B	RE-	RES-	FILD	1/3B	15-	WRD				
	QNT	QNT	QNT	QNT	QNT	QNT	QNT	QNT	QNT	QNT	QNT				

CM	PCT	PCT	PCT	(MUNS COLOR)	G/CC	G/CC	PCT	PCT	PCT	PCT	CM
000-28	24	25	3	7.5YR 3/2	5.3	.32	90	218		96	
028-62	18	29	3	7.5YR 3/2	5.3	.20	.40	.24	91	417	169
062-84	12	28	2	10 YR 5.5/3	5.6	.14	.29	.19	68	556	239
084-109	20	32	7	10 YR 5.5/3	5.5	.14	.29	.22	62	562	233
109-127	26	20	4	10 YR 6/4	4.9	.14	.43	.29	58	562	148
127-183	37	10	1	10 YR 7/4	4.5	.14	.29	.13	49	577	276

Soil classification: Typic Mediasaprist; euic, mesic.

Series: Houghton.

Pedon No.: S74WI-55-2.

Location: Jefferson County, Wisconsin; NW $\frac{1}{4}$, SW $\frac{1}{4}$, sec. 27, T. 7 N., R. 16 E., 576 feet north from center of road opposite farmhouse. About 43° 07' N latitude and 88° 37' W longitude.

Climate: Humid continental. Mean annual temperature is 47.8° F; mean July temperature is 73.1° F; mean January temperature is 21.3° F; mean annual precipitation is 30.98 inches with nearly two-thirds of the precipitation falling during the growing season; total amount of snowfall is 41.9 inches; the growing season averages 159 days, but less in organic areas (data from Watertown, WI weather bureau substation).

Parent material: Deposits of herbaceous organic material more than 51 inches thick.

Physiography: Depressional area between drumlins.

Vegetation: Bluegrass sod (cut and sold as sod).

Size of area: About 2,000-3,000 acres interfingering between drumlins.

Distance to adjacent mineral soil: About 572 feet to south.

Depth to water table: 109 cm.

Microrelief: None

Subsidence: Estimated to be moderate.

Described and sampled by: G.W. Hudeison and C.L. Glocker. Sampled from pit to 72 inches.

Oap 74L1483 0 to 28 cm. Black (N 2/0), black (10YR 2/1) rubbed and pressed sapric material; 60 percent fiber, less than 2 percent rubbed; weak fine granular structure; very friable; fibers primarily herbaceous; about 10 percent mineral soil material; pH 6.0 (LaMotte); abrupt smooth boundary.

Oa2 74L1484 28 to 62 cm. Very dark brown (10YR 2/2), black (10YR 2/1) rubbed, very dark brown (10YR 2/2) pressed sapric material; 88 percent fiber, less than 2 percent rubbed; weak coarse prismatic structure parting to weak medium subangular blocky structure; very friable; fibers primarily herbaceous; about 10-15 percent mineral soil material; pH 6.2 (LaMotte); clear smooth boundary.

Oa3 74L1485 62 to 84 cm. Very dark brown (10YR 2/2), black (10YR 2/1) rubbed, very dark brown (10YR 2/2) pressed sapric material; 68 percent fiber, 4 percent rubbed; weak thin platy structure with some areas of massive (matted); very friable; fibers primarily herbaceous; about 10-15 percent mineral soil material; pH 6.2 (LaMotte); abrupt smooth boundary.

Oa4 74L1486 84 to 109 cm. Black (10YR 2/1) broken face, rubbed, and pressed sapric material; 72 percent fiber, 4 percent rubbed; massive (matted); very friable; fibers primarily herbaceous; about 10-15 percent mineral soil material; pH 6.4 (LaMotte); abrupt smooth boundary.

Oa5 74L1487 109 to 127 cm. Very dark grayish brown (10YR 3/2), very dark grayish brown (10YR 3/2), very dark gray (10YR 3/1) rubbed and pressed sapric material; about 25-30 percent fiber, less than 5 percent rubbed; massive with a few areas of weak thin platy structure; very friable; fibers primarily herbaceous; about 15 percent mineral soil material; pH 6.8 (LaMotte); gradual wavy boundary.

Oa6 74L1488 127 to 183 cm. Very dark gray (10YR 3/1) broken face, rubbed, and pressed sapric material; about 15-20 percent fiber, less than 5 percent rubbed; weak thin platy structure; very friable; fibers primarily herbaceous; about 15 percent mineral soil material; pH 6.8 (LaMotte).

Remarks:

1. 127-183 cm - sedge roots and leaves (easily identifiable).
2. 109-127 cm sedge roots, leaves, seeds, 1 wood fragment (easily identifiable).
3. 0-28 cm - some weak medium angular blocky structure (compaction by machinery).
4. 28-62 cm - sedge roots, leaves, and seeds are evident on broken face. Some tendency towards prismatic structure.
5. 62-84 cm - sedge roots evident on broken faces.
6. Water moves into pit down through vertical cracks. Some places in field have polygonal cracks at surface.
7. 109 cm is a soak line (wet); color change in material also.
8. Sand underlies organic material at 183 cm.
9. High percent of fibers (unrubbed) in this profile.
10. Sodium Pyrophosphate color test produced colors of: Oap-10YR 3/3; Oa2 - 10YR 3/3; Oa3 - 10YR 7/3; Oa4 - 10YR 7/3; Oa5 - 10YR 8/1; Oa6 - 10YR 8/1.

SOIL CLASSIFICATION-TYPIC EUTROBORALF
COARSE-LOAMY, MIXED
SERIES - - - - -IRON RIVER TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S72WI-21-9 COUNTY - - - FOREST

GENERAL METHODS - - 1A, 1B1B, 2A1.2B

SAMPLE NOS. 72L878-72L885

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -) RATIO														
		SAND	SILT	CLAY	FINE	VCOS	CORS	HEDS	FNES	VFMS	COSI	FWSI	VFSI	SAND	INTR	FINE
		2-	.05-	LT	CLAY	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY
CM		PCT LT 2MM - - - - -) PCT PCT CLAY														
000-12	A2	57.4	37.8	4.8	1.5	3.8	10.7	16.3	18.6	8.0	16.1	21.7		49.4	32.5	31
012-21	B21H1R	56.9	33.6	9.5	.9	3.5	9.8	15.2	19.6	8.8	14.2	19.4		48.1	32.0	9
021-52	B221R	62.1	32.0	5.9	.1	3.8	11.4	17.1	20.7	9.1	14.3	17.7		53.0	32.9	2
052-64	B231R	79.2	17.6	3.2	.3	6.3	15.1	21.5	25.7	10.6	8.9	8.7		68.6	31.0	9
064-82	B241RX	81.0	16.5	2.5	.2	5.7	15.2	23.0	26.6	10.5	8.2	8.3		70.5	30.6	8
082-140	A&BX	79.2	17.6	3.2	.1	7.2	16.2	22.4	24.2	9.2	8.1	9.5		70.0	27.9	3
140-200	B2T	78.2	15.7	10.1	3.0	6.3	16.3	21.0	21.7	8.9	6.8	8.9		65.3	24.8	30
200-225	B3T	75.3	14.0	10.7	3.5	5.9	17.8	22.3	21.2	8.1	6.2	7.8		67.2	23.1	33

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (- BULK DENSITY) (- - - WATER CONTENT - - -) CARBONATE (- - PH - -)													
	VOL. (- - - - -)	WEIGHT - - - - -)	4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6B1B	3A1A	8C1A	8C1E	
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVER	COLE	1/10	1/3-	15-	WRD
	2	75				.074	PCT	BAR	DRY		BAR	BAR	CH/	
CM	PCT	PCT	(- - - PCT LT 75 - - -)	LT20	6/CC	6/CC	PCT	PCT	PCT	PCT	PCT	PCT	PCT	CACL
000-12	10	TR	5	7	4	40	12	1.0	A					4.7
012-21	10	TR	5	7	5	40	13	1.2	A					4.6
021-52	10	TR	5	9	6	34	16	1.20	1.26	.015	34.5	25.6	5.7	4.8
052-64	30	5	20	11	6	17	23	1.6	A				2.5	4.8
064-82	35	5	25	7	7	15	19	1.9	A				1.7	4.8
082-140	35	5	25	9	7	15	21	1.91	1.93	.003	8.8	7.3	1.5	6.0
140-200	35	5	25	8	7	18	20	1.9	A				3.8	6.0
200-225	35	5	25	8	7	17	20	1.9	A				3.6	6.1

DEPTH	(ORGANIC MATTER)			IRON	PHOS	(- -EXTRACTABLE BASES 5B4A- -)				ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)			
	6A1A	6B1A	C/N	6C2B		6M2E	6O2D	6P2B	6Q2B		6H1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1	
	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	EXTB	NHAC	EXTB	NHAC	
	CARB			FE						EXTB	TEA	EXT	ACTY		TO	TO	NHAC	ACTY		
CM	PCT	PCT		PCT	PCT	(-	-	-	-	-NEQ	/ 100	G -	-	-	-	-	CLAY	PCT	PCT	PCT
000-12	.99	.081	12	.5	2.3	.7	.0	.1	3.1	5.2	.4	8.3	7.1	1.48	3.3	32	37	84		
012-21	1.84	.122	15	1.5	1.2	.4	TR	.1	1.7	22.6	3.5	24.3	15.3	1.61	3.0	8	7	11		
021-52	1.59	.083	19	1.1	.6	.1	.1	.1	.9	16.7	2.2	17.6	10.2	1.73	6.0	6	5	9		
052-64	.34	.019	18	.6	.2	TR	TR	TR	.2	5.8	.8	6.0	3.8	1.19	5	5	3	5		
064-82	.16			.5	.1	.0	.1	TR	.2	4.3	.6	4.5	3.1	1.24	3	4	6			
082-140	.09			.5	.6	.2	.1	.1	1.0	2.1		3.1	2.6	.81	3.0	23	32	38		
140-200	.04			.7	3.6	1.6	.1	.1	5.4	1.6		7.0	5.8	.57	2.3	62	77	93		
200-225	.04			.9	2.8	1.5	.1	.1	4.5	1.6		6.1	4.9	.46	1.9	57	74	92		

DEPTH	(SATURATED PASTE)			NA	NA	SALT	GYP	SATURATION EXTRACT 8A1- - - - -) ATTERBERG									
	8E1	8C1B	8A	5D2	5E	8D5	6P1A	8A1A	6H1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A
	REST	PH	H2O	ESP	SAR	TOTL	PC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	4F1
	ORGN					SOLU	MMBOS/	CM	- - - - -)	-NEQ	/ LITER	- - - - -)	- - - - -)	- - - - -)	- - - - -)	- - - - -)	4P2
CM	CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	LIQD FLST
000-12																	
012-21																	
021-52																	
052-64																	
064-82																	
082-140	36000	5.0	13.8														.20
140-200																	
200-225																	

IDENTIFICATION OF THE SPODIC HORIZON BY LABORATORY CRITERIA.

DEPTH	HORIZON	(PYROPHOSPHATE, PH10)		(CIT - DIT)		(PYROPHOSPH)		PIRO	CEC
		6C5A	6G5A	6A1B	6C2B	6G7A	FE+AL	AL+C	FE+AL
		EXT	EXT	EXT	EXT	EXT	/	/	-1/2
		FE	AL	C	FE	AL	CLAY	CLAY	CLAY
		PCT	PCT	PCT	PCT	PCT	PCT	PCT	THIC
012-21	B21H1R	.8	.4		1.5	.4	.13		.63
021-52	B221R	.4	.4		1.1	.4	.14		.53
052-64	B231R	.1	.2		.6	.2	.09		.38
064-82	B241RX	.1	.1		.5	.1	.08		.33

(A) ESTIMATED.

(B) MICRO-PENETRATION RESISTANCE. A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 0.1-BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.

Soil classification: Typic Eutroboralf; coarse-loamy, mixed.

Soil: Iron River taxadjunct*.

Soil No.: S72 WI-21-9 (LSL No. 72L878-72L885).

Location: Forest County, Wisconsin; SW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 32, T. 38 N., R. 12 E.

Climate: Humid continental; mean annual temperature is about 37° to 43° F; average annual precipitation is about 30 inches; and frost-free season is 90 to 120 days.

Vegetation and land use: Natural vegetation was mixed northern hardwoods and conifers. Most of this soil is in second growth hardwoods and aspen. Some areas have been cleared and are used for general farming. Some wooded areas are pastured.

Parent material: Acid sandy loam glacial till.

Physiography: Gently sloping to steep glacial ground and recessional moraines.

Topography: Site is on a plane 2 percent slope in a hardwood-conifer forest.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate except for the fragipan which is moderately slow.

Described by: Steve Payne and Robert Fox.

Sampled by: Robert H. Jordan and Robert L. Juve, September 20, 1972.

(Colors are for moist soils unless otherwise stated)

O1 Partially decomposed leaves and new leaves from the forest cover.

O2 6 to 0 cm (2 to 0 inches). Very dark brown (10YR 2/2) decomposed leaves; weak fine granular structure; very friable.

A2 72L878 0 to 12 cm (0 to 5 inches). Dark reddish brown (5YR 4/2) fine sandy loam; weak fine granular structure; very friable; few fine gravel; roots common; very strongly acid; abrupt boundary.

B21hr 72L879 12 to 21 cm (5 to 8 inches). Dark reddish brown (2.5YR 3/4) fine sandy loam; weak medium subangular blocky structure; very friable; few roots; strongly acid; clear boundary.

B22ir 72L880 21 to 52 cm (8 to 21 inches). Dark red (2.5YR 3/6) fine sandy loam; moderate medium subangular blocky structure; very friable; few roots; very strongly acid; clear boundary.

B23ir 72L881 52 to 64 cm (21 to 25 inches). Reddish brown (5YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; a few brittle firm sandy loam which are more firm than the A&B horizon below; about 20 percent of fine gravel and 5 percent cobblestones; very strongly acid; abrupt boundary.

B24irx 72L882 64 to 82 cm (25 to 33 inches). Brown (7.5YR 4/4) loamy sand; weak medium subangular blocky structure; firm; a few beds of brittle firm sandy loam which are more firm than the A&B horizon below; about 20 percent of medium and coarse gravel and 10 percent of fine gravel, and about 5 percent cobblestones; strongly acid; clear boundary.

A&Bx 72L883 82 to 140 cm (33 to 56 inches). Brown (7.5YR 5/4) loamy sand and reddish brown (5YR 4/3) sandy loam; the loamy sand is structureless and loose, and the sandy loam has a weak medium subangular blocky structure; the sandy loam is brittle and weakly cemented; about 20 percent medium and coarse gravel and 10 percent fine gravel, about 5 percent cobblestones; medium acid; abrupt boundary.

B2t 72L884 140 to 200 cm (56 to 80 inches). Reddish brown (2.5YR 4/4) sandy loam; moderate medium subangular blocky structure; friable; many clay films and clay bridges; about 20 percent medium and fine gravel and 5 percent cobblestones; slightly brittle and weakly cemented; medium acid; clear boundary.

B3t 72L885 200 to 225 cm (80 to 90 inches). Reddish brown (2.5YR 4/4) sandy loam; weak medium subangular blocky structure; friable; a few clay films and some clay bridging; slightly acid; clear boundary.

C 225 to 250 cm (90 to 100 inches). Reddish brown (5YR 4/3) sandy loam; massive; friable; about 20 percent gravel.

Remarks: Sols is thicker than typical and appears to have been developed in coarser till overlying Gogebic till starting at 140 cm.

This pedon lacks a well expressed fragipan with spodic characteristics; therefore, it is a taxadjunct to the Iron River series.

Kalkaska variant

Bayfield County, Wisconsin

S49WI-4-1

Beltsville Soil Survey Lab. Nos. 49997-491003

Depth cm	Horizon	M.E./100 Grams Soil							% B. SAT	pH	% O.C.	Size Classes %						
		Ca	Mg	K	Na	H ¹	S+2	Clay				III3	USDA Silt	VFS	FS	MS	CS	VCS
2.5-0	O1	—	—	—	—	—	—	—	4.4	—	—	—	—	—	—	—	—	
0-20	A2	0.7	0.2	0.1	<0.1	2.2	3.2	31	4.8	0.51	2.4	10.5	20.5	9.1	33.4	23.0	10.2	1.4
20-33	B21hir	0.6	0.3	0.2	0.1	12.2	13.4	9	5.1	0.97	6.0	8.6	18.0	10.0	35.2	21.5	8.1	1.2
33-68	B22irx	0.5	0.1	0.1	<0.1	4.1	4.8	14	5.7	0.33	3.8	3.6	9.5	13.7	41.1	21.6	8.7	1.6
68-103	B3x	0.2	0.1	0.1	<0.1	2.1	2.5	16	5.6	0.15	2.0	2.6	6.6	12.0	38.2	22.6	14.1	4.5
103-133	IIC1x	0.3	0.1	0.1	<0.1	1.7	2.2	23	5.8	0.13	2.5	4.4	9.3	11.8	39.4	21.8	12.0	3.2
133-160	IIC2x	1.0	0.3	0.2	<0.1	1.3	2.8	54	6.0	0.08	4.5	11.1	20.0	13.7	34.0	17.2	8.5	2.1

1 Acidity

2 CEC by sum of cations

3 International III - This is PSDA fine silt (.02-.002 mm).

Soil classification: Typic Fraglorthod; sandy, mixed, frigid.

Soil: Kalkaska variant.

Soil No.: 849W1-4-1.

Location: Bayfield County, Wis.; NW $\frac{1}{4}$, Sec. 2, T. 48 N., R. 7 W.; about 1/4 mile south of junction of earth road and road to Lewanee lookout tower.

Climate: Humid continental; mean annual air temperature is about 39° to 45° F; average annual precipitation is 28 to 32 inches; frost-free season is 90 to 105 days.

Vegetation and land use: Largely in second growth timber of mixed deciduous and coniferous trees such as aspen, white birch, jack pine, and maple. Some cleared areas are used for pasture and forage production.

Parent material: Sandy acid glacial outwash over acid sandy loam till.

Physiography: Sloping to hilly upland.

Topography: On east-facing side slope of a ridge; gradient is 4 percent.

Drainage: Somewhat excessive to well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Rapid in solum; moderate in substratum.

Described by: J. K. Ableiter, I. J. Nygard, R. J. Muckenhirn, and V. J. Kilmer.

(Colors are for moist soil unless otherwise stated)

01 49997 2.5 to 0 cm (1 to 0 inches). Very dark brown (10YR 2/2) crushed, peaty organic matter, poorly decomposed; very friable; many fibrous roots, gray sand grains, bits of twigs, bark, leaves, and wood fragments; fungal mycelium and some gray particles present; constitutes a definite fairly strong mat on the surface.

A2 49998 0 to 20 cm (0 to 8 inches). Reddish gray (5YR 5/2) sand, pinkish gray (5YR 7/2) dry; weakly coherent subangular blocky structure parting to weak small granules; very friable; many roots; abrupt irregular boundary; strongly acid.

B21hr 49999 20 to 33 cm (8 to 13 inches). Dark reddish brown to reddish brown (5YR 3/4 to 4/4) loamy sand, light reddish brown to light brown (5YR 6/4 to 7.5YR 6/4) dry; cemented ortstein in places which are angular, hard and difficult to fracture or crush; ortstein is more yellowish brown, weakly cemented and crushes easily; roots penetrate this horizon vertically but are more extensive at top and bottom where they are horizontally extended; ortstein fragments are dark reddish brown on exterior and lighter brown on interior; irregular boundary with tongues extending into horizon below; medium acid.

B221rx 491000 33 to 68 cm (13 to 27 inches). Reddish brown (5YR 4/4) loamy sand, light reddish brown (5YR 6/4) dry; slightly cemented in place parting to subangular blocks which crush easily; few roots; roots are concentrated where the material is looser; irregular boundary with tongues extending into lower horizon; medium acid.

B3x 491001 68 to 103 cm (27 to 41 inches). Reddish brown (2.5YR 5/4) loamy sand, reddish brown to light reddish

Kalkaska

Bayfield County, Wisconsin

S49WI-4-2

Beltsville Soil Survey Lab. Nos. 491004-491010

Depth cm	Horizon	M.E./100 Grams Soil						% B. SAT	pH	% O.C.	Size Classes %							
		Ca	Mg	K	Na	H ¹	S ²				Clay	III ³	USDA Silt	VFS	FS	MS	CS	VCS
2.5-0	O2	--	--	--	--	--	--	--	5.8	--	--	--	--	--	--	--	--	--
0-17	A2	0.6	0.1	0.1	<0.1	1.3	2.1	38	4.8	0.44	1.9	4.5	6.8	2.6	27.6	29.8	26.3	5.0
17-40	B2hir	0.4	0.2	0.1	0.1	9.1	9.9	8	5.9	0.81	5.9	3.2	4.4	3.2	36.7	27.9	16.3	5.6
40-53	B3ir	0.3	<0.1	0.1	0.1	3.9	4.4	11	5.4	0.35	2.6	1.0	0.9	2.1	43.2	31.5	15.6	4.1
53-85	B3	0.1	<0.1	<0.1	<0.1	1.4	1.5	7	6.0	0.14	1.5	0.0	0.6	5.0	60.6	24.5	6.4	1.4
85-128	C1	0.2	<0.1	<0.1	0.1	1.3	1.6	19	6.0	0.13	1.6	0.0	0.1	3.9	46.3	21.8	19.8	6.5
128-160	C2	0.2	0.1	<0.1	0.1	1.0	1.4	28	5.8	0.07	1.7	0.7	6.9	13.2	36.5	32.2	8.3	1.2

1 Acidity

2 CEC by sum of cations

3 International III - This is PSDA fine silt (.02-.002 mm).

Soil classification: Typic Haplorthod: sandy, mixed, friid.

Soil: Kalkaska.

Soil No.: S49WI-4-2.

Location: Bayfield County, Wisconsin; NW $\frac{1}{4}$, NE $\frac{1}{4}$ of Sec. 13, T. 50 N., R. 8 W.; 100 feet east of northwest to south-east side road and 0.3 mile northeast of Port Wing.

Climate: Average annual precipitation is 28 to 32 inches. Mean annual air temperature is about 39° to 45° F. Frost-free season is 90 to 105 days.

Vegetation and land use: Largely in second growth timber of mixed deciduous and coniferous trees such as aspen, white birch, jack pine, oak, and maple. Ground cover consists of grasses, forbs, ferns, blueberry, and mosses. Some cleared areas are used for pasture and forage production.

Parent material: Sandy acid glacial outwash.

Physiography: Nearly level to steep uplands.

Topography: On north-facing side slope of high ridge.

Drainage: Somewhat excessive to well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Rapid.

Described by: J. K. Ablesiter, I.J. Nygard, R.J. Muckenhirn, and V.J. Kilmer

(Colors are for moist soil unless otherwise stated)

O1 Consists of 1/4 inch of birch, oak, and forb leaves.

O2 491004 2-1/2 to 0 cm (1 to 0 inches) Dark gray to very dark brown and black (10YR 4/1, 2/2 and 2/1) peaty organic matter with some sand grains; forms a strong mat which can be cut loose and handled in patches or strips; contains fine roots, mycelia, bits of charcoal and twigs; grades into a very thin (1/4 inch) A1.

A2 491005 0 to 17 cm (0 to 7 inches). Pinkish gray (5YR 6/2) loamy sand, pinkish gray (5YR 7/2) dry, and dark reddish gray (5YR 4/2) wet; very weakly coherent; very friable; numerous roots up to 1/2 inch in diameter; some mixing and gradation in patches or pockets with the B2hr horizon below; strongly acid; irregular boundary.

B2hr 491006 17 to 40 cm (7 to 16 inches). Yellowish red to reddish brown (5YR 4/6 to 4/4) loamy sand. Light

very friable; spheres or zones of darker brown cemented ortstein about 2 to 6 inches in diameter occur and extend downward into the horizon below; these appear to be old root channels; common roots, mostly woody, 1/8 to 1/4 inch in diameter; few sandstone, granite and basalt pebbles; strongly acid.

B3ir 491007 40 to 53 cm (16 to 21 inches). Yellowish red (5YR 4/6) loamy sand, reddish brown (5YR 5/4) dry; weakly coherent with little tendency toward structure; very friable; many roots, generally woody and 1/8 to 1/4 inch in diameter; cylinders or tongues of cemented ortstein extend into this horizon from the B2hr horizon; a large rock, 18 inches in diameter extends through this horizon and into the one above; medium acid.

B3 491008 53 to 85 cm (21 to 34 inches). Yellowish red to reddish brown (5YR 4/6 to 4/4) sand, light reddish brown (5YR 6/4) dry; weakly coherent to single grained; very friable to loose; few roots, mostly vertical and

SOIL CLASSIFICATION-AQUIC GLOSSOBORALF
FINE-LOAMY, MIXED
SERIES - - - - -KERT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S70W15-71-5 COUNTY - - - WOOD

GENERAL METHODS- - -1818,2A1,2B

SAMPLE NOS. 70L952-70L959

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -															RATIO	
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFST	TEXT	INTR	FINE	NON-
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	2-	TO	CLAY	15-
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.002	2-1	.02	CLAY	BAR
		PCT LT 2MM - - - - -															PCT	CLAY
000-14	AP	39.9	48.1	12.0	4.1	1.1	2.0	3.8	24.7	8.3	22.0	26.1	4.6	31.6	46.3	34		.48
014-35	A2	29.3	52.9	17.8	7.0	.7	1.7	3.2	17.2	6.5	23.9	29.0	5.6	22.8	40.8	39		.41
035-55	2ACB	77.6	16.1	6.3	2.4	2.5	4.8	7.3	46.7	16.3	6.4	9.7	3.4	61.3	55.1	38		.40
055-83	2B&A	47.7	28.7	23.6	12.6	4.6	4.9	3.7	16.9	17.6	10.0	18.7	7.4	30.1	40.1	53		.42
083-100	2C1	76.6	13.0	10.4		4.1	5.1	4.3	26.5	36.6	5.0	8.0	3.8	40.0	63.1			.43
100-132	2C2	21.2	38.8	40.0		2.4	2.3	1.3	5.0	10.2	10.7	28.1	10.5	11.0	24.6			.39
132-172	2C3	48.5	27.5	24.0		3.7	6.1	4.2	17.1	17.4	8.2	19.3	8.7	31.1	38.2			.39
000-14	2AP (A)																	

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	VOL. (- - - - - WEIGHT - - - - -)										4A10	4A1H	401	481C	481C	482	4C1		6E1B	3A1A	8C1A	8C1E		
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD					2	LT	1/1	1/2		
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	CM	PCT	PCT	PCT	PCT		
000-14	TR	0	TR	TR	1	62	1	1.47	1.53	.014	22.6	20.2	5.8	.22									7.1	7.0
014-35	0	0	0	0	0	74	0	1.69	1.70	.002	19.4	17.7	7.3	.18	5.48								5.4	4.9
035-55	0	0	0	0	0	27	0								2.5								4.6	4.1
055-83	TR	0	0	0	0	59	TR								9.8								4.1	3.6
083-100	0	0	0	0	0	35	0								4.5								4.4	3.8
100-132	0	0	0	0	0	85	0								15.5								4.2	3.8
132-172	0	0	0	0	0	60	0								9.3								4.3	3.9
000-14	TR	0	TR	TR	TR		TR								6.1								7.0	7.0

DEPTH	ORGANIC MATTER		IRON	PHOS	EXTRACTABLE BASES 5B4A- -)				ACTY	AL	CAT EXCH		RATIO		RATIO		CA	BASE SAT	
	6A1A	6B1A	C/N	6C2B	6N2E	6O2D	6P2B	6Q2B		6H1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1	
	DRGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
CM	PCT	PCT		PCT	PCT	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)	(- - - - -)
000-14	1.32	.099	13	0.7		12.6	0.5	0.2	0.2	13.5	2.8		16.3	10.0	0.83	25.0	126	83	135
014-35	0.33	.036	9	0.9		6.2	0.8	0.2	0.2	7.4	5.9	0.6	13.3	10.1	0.57	7.8	61	56	73
035-55	0.08	.010		0.2		0.8	0.3	0.1	0.1	1.3	2.2	0.7	3.5	2.6	0.41	2.7	31	37	50
055-83	0.07	.022		0.5		1.3	1.1	0.1	0.4	2.9	8.3	3.4	11.2	8.9	0.38	1.2	15	26	33
083-100	0.03			0.1		0.7	0.7	0.1	0.2	1.7	3.5	1.6	5.2	3.9	0.38	1.0	18	33	44
100-132	0.03			1.5		1.9	3.0	TR	0.6	5.5	9.3	3.5	14.8	12.4	0.31	0.6	15	37	44
132-172	0.03			0.3		1.5	2.4	0.2	0.5	4.6	4.4	1.3	9.0	7.4	0.31	0.6	20	51	62
000-14	1.53																		

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	SATURATION EXTRACT 8A1-										ATTERBERG	
	8E1	8C1B	8A	502	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2	
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LOID	PLST	
	DHM-					SDLU		MMHOS/										LMIT	INDX	
CM	CM		PCT	PCT		PPM	PCT	CM	(				MEQ / LITER					PCT	
000-14																				
014-35																				
035-55																				
055-83																				
083-100	9900	4.2	28.7	3		40		0.34	0.7	0.8	0.3	0.5								
100-132																				
132-172																				
000-14																				

(A) COMPOSITE OF SEVERAL SURFACE SAMPLES.
(B) MICRO-PENETRATION RESISTANCE - A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 1/10- BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.

Soil classification: Aquic Glossoboralfs; fine-loamy, mixed.

Soil: Kert.

Soil No.: S7OWI-71-5.

Location: Wood County, Wisconsin; SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 19, T. 24 N., R. 3 E.; 500 feet east and 300 feet north of field corner.

Climate: Humid continental; mean annual temperature is about 43° F mean annual precipitation is about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Original vegetation was mixed northern hardwoods with some coniferous trees. Most areas of this soil are in second-growth woodlots. Cleared areas are used for general farming.

Parent material: Thin silty sediments over stratified residuum from sandstone and shale.

Physiography: Rock-controlled upland on gently sloping or nearly level relief.

Topography: Site is on a 1 to 2 percent plane slope.

Drainage: Somewhat poorly drained.

Groundwater: Deep - perched water table exists at a depth of 2 feet or less in this soil for some periods most years.

Erosion: Slight.

Permeability: Moderate to slow.

Described by: Paul H. Carroll

(Colors are for moist conditions unless designated otherwise)

Ap 70L952 0 to 14 cm (0 to 5 inches). Very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; many fine fibrous roots; neutral; abrupt smooth boundary.

A2 70L953 14 to 35 cm (5 to 14 inches). Brown (10YR 5/3) silt loam with many fine prominent mottles of yellowish brown (10YR 5/6-5/8); weak fine platy structure; friable; common fine fibrous roots; strongly acid; clear wavy boundary.

IIA&B 70L954 35 to 55 cm (14 to 22 inches). Pale brown (10YR 6/3) loamy fine sand (A2) with many fine prominent mottles of yellowish brown (10YR 5/6-5/8); very weak fine subangular blocky structure; very friable; brown (10YR 5/3) sandy loam remnants of Bt are scattered through the horizon and occupy about 30 percent of the soil volume; few thin clay films are on faces of peds and in some pores or bridge sand grains in the Bt portion of the horizon; strongly acid; abrupt wavy boundary.

IIB&A 70L955 55 to 83 cm (22 to 33 inches). Reddish brown (2.5YR 4/4) sandy clay loam (Bt) with many fine prominent mottles of strong brown (7.5YR 5/6) and brown (7.5YR 5/2); strong coarse platy structure parting to moderate fine angular blocky structure; very firm; continuous thick clay films of very dark gray (10YR 3/1) and dark gray (10YR 4/1) along horizontal cleavage planes and thin on faces of angular blocky peds; brown (10YR 5/3) tongues of fine sandy loam (A2) penetrate the horizon from above and occupy approximately 35 percent of the soil volume; many fine prominent mottles of strong brown (7.5YR 5/6-5/8); weak fine subangular blocky structure; firm; strongly acid; clear wavy boundary.

IIIC1 70L956 83 to 100 cm (33 to 40 inches). Olive yellow (2.5Y 6/6) and pale green (5G 7/2) loam; weak fine angular blocky structure; firm; few thin clay films on vertical faces of peds; thin (approximately 1/2 inch) layers of pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) hard platy sandstone at intervals of approximately 2 inches; very strongly acid; abrupt smooth boundary.

IIIC2 70L957 100 to 132 cm (40 to 52 inches). Dark reddish brown (2.5YR 3/4) silt loam; weak fine angular blocky structure; firm; few thin clay films on vertical faces of peds; few thin pinkish gray (7.5YR 7/2) silt coats on faces of peds; very strongly acid; abrupt smooth boundary.

IIIC3 70L958 132 to 172 cm (52 to 68 inches). Olive (5Y 5/3,5/4) and pale green (5G 7/2) clay loam; weak fine angular blocky structure; firm; few thin clay films on vertical faces of peds; thin (approximately 1/2 inch) layers of pale brown (10YR 6/3) hard platy sandstone at intervals of approximately 4 inches; strongly acid.

Additional notes: At 150 cm depth, the soil temperature is 12.5° C.

SOIL CLASSIFICATION-TYPIC BOROSAPRIST

EUC
SERIES - - - - - LUPTON

SOIL NO - - - - - S74W1-67-3 CCNTY - - - LANGLADE

GENERAL METHODS - - 1A,181B,2A1,2B

SAMPLE NOS. 74L850-74L856

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -)RATIO														
		SAND	SILT	CLAY	FINE	CLAY	VCOS	COS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	INTR
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY
CM		PCT LT 2MM - - - - -) PCT PCT CLAY														
000-005	CA1															
005-015	OA2															
015-050	CA3															
050-096	CA4															
096-175	CA5															
175-195	LC0															
195+	2C6	16.5	64.1	19.4		1.4	3.0	3.6	3.8	4.7	31.9	32.2		11.8		5.07

DEPTH	PARTICLE SIZE ANALYSIS, MM, 30, 301, 3021(BULK DENSITY)(- - - - -)WATER CONTENT- - - - -) CARBONATE (- -PH - -)										(- -PH - -)			
	VOL. (- - - - -)	WEIGHT - - - - -)	4A1D	4A1H	4D1	4B1C	4B1C	4B2A	4C1	4E1B	3A1A	8C1A	8C1E	
	6T	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	
	2	75			.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/	
CM	PCT	PCT	PCT	PCT	LT 75	LT 20	G/CC	G/CC		PCT	PCT	PCT	PCT	
000-005	TR	0	0	0	TR									79.6
005-015	0	0	0	0	0		.08	.17		1230	951	104	.90	
015-050	0	0	0	0	0		.12	.27		775	665	102	.81	
050-096	0	0	0	0	0		.12	.25		819	684	101	.86	
096-175	0	0	0	0	0									98.4
175-195	0	0	0	0	0									
195+	TR	0	0	0	TR									

DEPTH	(ORGANIC MATTER)			IRON	PHOS	(- -EXTRACTABLE BASES 5B4A- -)				ACTY	AL	(CAT-EXCH)		RATIO	RATIO	CA	(BASE SAT)	
	6A1A	6B1A	C/N	6C2B	6N2E	6O2D	6P2B	6Q2B		6H1A	6G1E	5A3A	5A6A	8D1	8E3	5F1	5C3	5C1
	ORGN	NITG		EXT	TCTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB
	CARB			FE						EXTB	TEA	EXT	ACTY		TO	TO	NHAC	ACTY
CM	PCT	PCT		PCT	PCT	(- - - - -	-MEQ	/ 100	G- - - - -	- - - - -	- - - - -	- - - - -	- - - - -	) CLAY	MG	PCT	PCT	PCT
000-005	46.0	1.53	30			48.8	10.3	.2	2.6	61.9	94.9		157	103		4.7	47	39
005-015	49.1	1.62	30			149	48.7	.3	.6	199	57.2		256	192		3.1	78	78
015-050	51.3	1.76	29			173	45.6	.2	.1	219	61.2		280	200		3.8	87	78
050-096	48.9	1.74	28			190	51.6	.2	.1	242	60.0		302	213		3.7	89	80
096-175	46.1	1.78	26			185	51.0	.2	.1	236	46.8		283	201		3.6	92	83
175-195																		
195+																		

DEPTH	(SATURATED PASTE)										SATURATION EXTRACT 8A1-										ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2			
	REST	PH	M2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LIQD	PLST			
	OHF-					SGLU		MMHOS/										LMIT	INDX			
CM	CM		PCT	PCT		PPM	PCT	CM	(			MEQ / LITER						PCT	
C00-005	3100	4.7	582			1400		.57	1.9	.8	.1	1.0	0	2.1	.0	.9	1.6					
005-015	4500	5.4	1030			1200		.14	1.0	.6	.1	.1	0	1.2	.0	.0	.0					
C15-C20	3400	5.7	737			1500		.31	1.9	1.1	.1	TR	0	1.2	.0	1.1	.0					
050-096	1900	5.8	691			6500		1.18	8.7	5.7	.1	.1	0	.6	.0	15.3	.0					
C96-175	1400	6.3	700			4900		.95	6.6	4.2	.1	.1	0	.3	.0	12.2	.0					
175-195																						
195+																						

DEPTH	HISTOSOL CHARACTERIZATION- - - - -) (- -WATER CONTENT- -)										(- -PH - -)			
	8F	8G	8H	8C1E	4A3A	4A1I	4D1	8B4	4B1C	4B2	4C1			
	MINL	(FIBER VOL)	PYROPHOSPHT	.01M	FILED	1/3B	RE-	FILED	1/3B	15-	WRD			
CM	PCT	PCT	PCT	(MUNS COLOR)	G/CC	G/CC	PCT	PCT	PCT	PCT	CM/			
000-005	26	56	30A	10YR 6/3	5.2	.13		35	499		87.2			
005-015	16	30	12	10YR 5/3	5.6	.12	.09	.24	40	674	775	104	.60	
015-050	16	36	10	10YR 5/3	5.5	.15	.14	.24	70	595	488	98.0	.55	
050-096	20	30	3	10YR 4/2	5.6	.17	.15	.19	76	494	530	90.5	.66	
096-175	24	32	8	10YR 3/2	5.9	.15			63	542		83.9		
175-195														
195+														

(A) INCLUDES LIVE ROOTS (20 PCT).

Soil classification: Typic Borosapriat; euic.

Series: Lupton.

Pedon No.: S74WI-67-3.

Location: Langlade County, Wisconsin; NW $\frac{1}{4}$, SW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 18, T. 32 N., R. 11 E.; 250 feet east of Hwy B; 1,000 feet north of section center. About 45.2° north latitude and about 89.0° west longitude.

Climate: Humid continental. Mean annual temperature is 42.2° F; mean July temperature is 68.5° F; mean January temperature is 13.8° F; mean annual precipitation is 29.86 inches with nearly two-thirds of this during the growing season; total amount of snowfall is 48 inches; frost-free season is 138 days at Antigo but less on organic soil areas.

Parent material: Organic soil material derived primarily from woody plants mixed with sedge, grass, and reed remains.

Physiography: Moderately deep depression between a large, nearly level, outwash plain to the south and a major rolling recessional moraine to the north. Bog area is nearly level. Elevation is about 1,560 feet.

Vegetation: Overstory of white cedar, balsam fir, black ash with scattered soft maple, American elm and tamarack. Lower story of grasses, forbs, sedges, and reeds.

Size of area: 160 to 200 acres.

Distance to adjacent mineral soil: About 600 feet.

Depth to water table: About 1 foot or 30 cm.

Microrelief: Few low small hummocks less than 12 inches high.

Subsidence: Slight; road ditch provides some drainage to area and some subsidence has taken place.

Soil temperature: Measured soil temperature of 13.0° C. at 50 cm.

Described and sampled by: G. Hudelson, Warren Lynn, W.E. McKinzie, and S. Payne on Aug. 8, 1974. Samples were obtained from a pit dug with a spade and posthole digger.

Oa1 74L850 0 to 5 cm. Black (5YR 2/1) broken face, rubbed, or pressed sapric material; weak medium subangular blocky structure; very friable; fiber content 25 percent undisturbed, 8 percent rubbed; fibers primarily from grasses and sedges; mineral content about 10 percent; many fine and few coarse roots; pH 6.5 (Truog); clear smooth boundary.

Oa2 74L851 5 to 15 cm. Black (5YR 2/1) broken face, rubbed or pressed sapric material; weak medium and coarse subangular blocky structure; very friable; fiber content 20 percent undisturbed, less than 5 percent rubbed; fibers dominantly from grasses and sedges, with a few conifer needles; mineral content about 10 percent; few coarse roots; pH 6.5 (Truog); abrupt smooth boundary.

Oa3 74L852 15 to 50 cm. Black (5YR 2/1) broken face, rubbed or pressed sapric material; weak coarse platy structure with a few weak medium subangular blocks; very friable; fiber content 15 percent undisturbed and less than 5 percent rubbed; fibers are dominantly woody with some herbaceous; estimated 15 percent wood fragments with dark reddish brown (5YR 3/4) color; mineral content about 15 percent; few coarse roots; pH 6.5 (Truog); clear smooth boundary.

Oa4 74L853 50 to 96 cm. Black (5YR 2/1) broken face, rubbed, or pressed sapric material; weak coarse platy structure with a few thin plates; very friable; fiber content about 25 percent undisturbed and 8 percent rubbed; fibers are dominantly woody with some herbaceous; about 35 percent wood fragments with reddish brown and dark reddish brown (5YR 4/4 and 3/4) colors; mineral content about 10 percent; pH 6.5 (Truog); clear smooth boundary.

Oa5 74L854 96 to 175 cm. Dark reddish brown (5YR 2/2) broken face sapric material; black (5YR 2/1) rubbed and dark reddish brown (5YR 2/2) pressed; weak coarse platy structure; very friable; about 20 percent fibers undisturbed, 5 percent rubbed; fibers dominantly woody with some herbaceous; about 10 percent wood fragments with reddish brown (5YR 4/4) color; 10 percent mineral matter; pH 7.2 (Truog); gradual wavy boundary.

Lco 74L855 175 to 195 cm. Dark reddish brown (5YR 3/2) broken face, rubbed, or pressed limnic material; massive; very friable; pH 7.2 (Truog); abrupt smooth boundary.

IICg 74L856 195 cm plus. Dark gray (5Y 4/1) silt loam; massive; friable.

SOIL CLASSIFICATION-TYPIC BORDSPRIST

EUC
SERIES - - - - - LUPTCN

SOIL NO - - - - - 574M1-83-1 COUNTY - - - OCONTO

GENERAL METHODS- - - 1A,1B1B,2A1,2B

SAMPLE NOS. 74L864-74L871

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO		
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	INTR	FINE	NON-
		2-	.05-	LT	CLAY	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CO3-
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.002	.10	.02	CLAY	15-
		PCT LT 2MM														PCT	PCT	CLAY

000-020	0A1																	
020-038	CA2																	
038-046	DE																	
046-070	CA3																	
070-117	CA4																	
117-150	0A5																	
150-215	CE2																	
215-358	2C																	

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	4B1C	4B1C	4B1C	4B1C	4B1C	4B1C	4B1C	4B1C	6B1B	3A1A	8C1A	8C1E	1/1	1/2
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-020	TR	0	0	TR	TR		TR	.29	.54		309	249	68.8	.70									6.5	6.0
020-038	TR	0	0	TR	TR		TR	.33	.76		283	211	58.3	.74									6.5	6.1
038-046	TR	0	0	TR	0		TR						82.6										6.1	5.7
046-070	0	0	0	0	TR		TR	.25	.44		380	320	81.1	.75									6.0	6.0
070-117	0	0	0	0	0		0																	
117-150	0	0	0	0	0		0																	
150-215	0	0	0	0	0		0																	
215-358	0	0	0	0	0		0																	

DEPTH	ORGANIC MATTER			IRON	PHOS	EXTRACTABLE BASES 5B4A- -				ACTY	AL	CAT EXCH		RATIO	RATIO	CA	(BASE	SAT)
	6A1A	6B1A	C/N	6C2B	6M2E	6O2D	6P2B	6Q2B	6M1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1	
	ORGN	NITG		EXT	TCFL	CA	MG	NA	K	BACL	KCL	EXTB	NHAC	CA	SAT	EXTB	NHAC	
	CARD			FE						SUM	TEA	EXT	ACTY	TO	TO	NHAC	ACTY	
CM	PCT	PCT		PCT	PCT	(-	-	-	-	HEQ	/	100	6-	-	-	-	PCT
000-020	36.1	1.73	21		100	25.4	.2	.3	126	18.1		144	107	3.9	93	87	118	
020-038	34.8	1.88	18		118	27.2	.2	.1	146	23.9		169	116	4.3	102	86	125	
038-046	46.6	2.26	21		147	26.4	.4	.3	174	46.6		221	164	5.6	90	79	106	
046-070	45.5	1.58	29		176	29.0	.4	.1	206	61.7		267	199	6.1	88	77	103	
070-117																		
117-150																		
150-215																		
215-358																		

DEPTH	(SATURATED PASTE)			NA	NA	SALT	GYP	SATURATION										EXTRACT			SAL-			ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6M1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2						
	REST	PM	M2C	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LQ1D	PLST						
	OHM-					SCLU		MMHES/										LNIT	INOX						
CM	CM		PCT	PCT		PPM	PCT	CM	(				MEQ / LITER	-				PCT			
C00-020	2600	7.0	491			1600		.41	3.1	1.8	.1	.1	0	1.8	.5	2.2	1.6								
020-038	2500	7.1	615			2300		.56	3.8	2.0	.1	TR	0	1.5	.5	4.1	1.1								
038-046	2300	6.5	614			2700		.65	4.5	2.1	.3	TR	0	.6	.2	5.8	.0								
046-070	2500	6.1	510			1900		.53	3.8	1.6	.3	.0	0	.3	.5	4.8	.0								
070-117																									
117-150																									
150-215																									
215-358	750	5.7	238			5400		3.41	22.9	11.4	.4	.6	0	1.2	.2	5.4	30.0								

DEPTH	HISTOSOL CHARACTERIZATION										WATER CONTENT			
	8F	8G	8H	8I	8J	8K	8L	8M	8N	8O	8P	8Q	8R	8S
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-020	45	37	8	7.5YR	3/2	6.9	.20				41	296	62.3	
020-038	44	28	4	7.5YR	4/2	7.1	.21				44	364	73.2	
038-046		57	11	10YR	3/2	6.1							83.7	
046-070	24	16	3	10YR	3/1	5.6	.18	.27	.18	76	399	242	75.6	.45
070-117		16	4	10YR	3/2	6.1								
117-150		38	12	10YR	5/3	5.9								
150-215		48	11	10YR	6.5/3	5.9								
215-358		56	16	10YR	7/2.5	5.8								

Soil classification: Typic Borosaprist; euic.

Series: Lupton.

Pedon No.: S74WI-83-1.

Location: Oconto County, Wisconsin; NE $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 14, T. 29 N., R. 21 E.; 200 feet east of NW forty line and 80 feet south of center of road. About 45.0 deg. north latitude and about 88.1 deg. west longitude.

Climate: Humid continental. Mean annual temperature is 44.9° F; mean July temperature is 70.9° F; mean January temperature is 18.6° F; mean annual precipitation is 27.05 inches with nearly two-thirds of this during the growing season; total amount of snowfall is 39.8 inches; frost-free season is 133 days at Marinette but less on organic soil areas. (Data from Oconto, WI., weather bureau substation.)

Parent material: Organic soil material derived primarily from woody plants with some herbaceous plant remains.

Physiography: Moderately deep depression in a large, gently undulating lake plain. Bog area is nearly level.

Elevation is about 900 feet.

Vegetation: Overstory of white cedar, black ash, willow, white birch, and tag alder with an understory of sedges, grasses, and forbs.

Size of area: About 2,000 acres.

Distance to adjacent mineral soil: 1,450 feet to west.

Depth to water table: 50 cm.

Microrelief: Many low hummocks 12 to 18 inches in height.

Subsidence: Slight; area has not been drained.

Soil temperature: Measured soil temperature of 58° F at 20 inches.

Described and sampled by: G. Hudson, Warren Lynn, W.E. McKinzie, H. Lorenz, G.B. Lee, and A.J. Klingelhoets on Aug. 5, 1974. Samples were obtained from a pit down to 46 inches and with a peat sampler to a depth of 144 inches.

Oa1 74L864 0 to 20 cm. Black (10YR 2/1) broken face, rubbed, or pressed sapric material; weak fine subangular blocky structure; very friable; about 10 percent fibers undisturbed, less than 2 percent rubbed; fibers dominantly woody with some herbaceous; 20 percent mineral content; many fine and large roots; pH 7.5 (Truog); clear smooth boundary.

Oa2 74L865 20 to 38 cm. Black (10YR 2/1) broken face, rubbed, or pressed sapric material; weak coarse prismatic structure parting to weak medium subangular blocky structure; very friable; about 5 percent fibers undisturbed, less than 2 percent rubbed; fibers dominantly woody; about 20 percent mineral content; few roots; pH 7.5 (Truog); clear smooth boundary.

Os 74L866 38 to 46 cm. Black (7.5YR 2/1) broken face hemie material; black (10YR 2/1) rubbed and very dark brown (10YR 2/5) smeared; weak coarse platy to warty structure; friable; about 55 percent fibers undisturbed

SOIL Magnor taxadjunct SOIL Nos. 869WI-54-2 LOCATION Rusk County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 69B255 - 69B261

Depth (cm)	Horizon	1B1b Size class and particle diameter (mm) 3A1														3B2	Coarse fragments 3B1		
		Total			Sand							Silt					3B1		
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (≤ 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	Int. III (0.05-0.02)	Int. II (0.02-0.002)	Int. I (0.002-0.001)	Int. I (0.001-0.0005)	Int. I (0.0005-0.0002)	Int. I (0.0002-0.0001)		2A2 ≥ 2	2-19	19-75
0.074																		cm	

Soil classification: Dystric Eutrochrept; coarse-loamy, mixed, frigid.

Soil: Magnor taxadjunct*.

Soil No.: 869WI-54-2.

Location: Rusk County, Wisconsin; SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 33, T. 36 N., R. 6 W.; 50 feet east and 100 feet north of intersection of fence line with the road.

Climate: Humid continental; mean average temperature ranges from 41° to 45° F; mean annual precipitation is 30 inches and frost-free season is about 125 days.

Vegetation and land use: Native vegetation was mixed northern hardwoods with some pine. Principal species were oak, ash, elm, maple, aspen and white pine. About 50 percent of this soil is used for cropland and livestock pasture. Corn, oats, and forages are the principal crops.

Parent material: Thin loess cap over acid sandy loam glacial till.

Physiography: Nearly level to sloping glacial till plain.

Topography: Nearly level site with 1 percent slope.

Drainage: Somewhat poorly drained.

Ground water: Seasonally less than 3 feet from surface.

Erosion: Slight.

Permeability: Moderately slow.

Described by: Paul H. Carroll

(Colors are for moist soil unless otherwise stated)

Ap 69B255 0 to 20 cm (0 to 8 inches). Very dark grayish brown and dark grayish brown (10YR 3/2 & 4/2) silt loam, gray (10YR 6/1) dry; weak fine subangular blocky structure; friable; many roots; medium acid; abrupt smooth boundary.

A2 69B256 20 to 34 cm (8 to 14 inches). Variegated brown and yellowish brown (10YR 5/3, 5/6, 5/8) silt loam marginal to silt; weak fine platy structure; friable; many roots; strongly acid; clear wavy boundary.

IIA&B 69B257 34 to 46 cm (14 to 18 inches). Dark grayish brown (10YR 4/2) sandy loam A2 material occupies about 60 percent of the horizon body and surrounds isolated remnants or upward extensions of reddish brown (5YR 4/4) sandy

loam or loam with slightly higher clay content and with common medium distinct mottles of yellowish red (5YR 4/6-4/8); weak coarse platy structure in the A2 material and weak medium subangular blocky structure in the B2t material; friable; common roots; very strongly acid; clear wavy boundary.

IIB&A 69B258 46 to 62 cm (18 to 23 inches). Reddish brown (5YR 4/4) sandy loam with common medium prominent yellowish red (5YR 4/8) mottles and dark reddish gray (5YR 4/2) tongues of sandy loam with slightly lower clay content; A2 tongues with common medium distinct reddish brown (5YR 5/4) mottles occur about 30 percent of the horizon

body; moderate medium subangular blocky structure in the B2t portion of the horizon and weak thick platy structure in the A2 portion; friable in the A2 portion and firm with slightly fragic consistence in the B2t portion; thin patchy clay films on horizontal faces of peds and in pores and accumulated as small pockets or horizontal streaks at the base of the tongues. Contains 8 to 10 percent gravel and cobblestones; common roots; strongly acid; clear irregular boundary.

IIB2t 69B259 62 to 84 cm (23 to 33 inches). Dark reddish brown (5YR 3/4) sandy loam with thin interfingers and occasional tongues (2 to 6 cm thick) of loamy sand extending halfway through this horizon; moderate thick platy structure parts under pressure to weak medium subangular blocky structure; firm with slightly fragic consistence; few thin clay films continuous or nearly so on horizontal faces of peds and common on vertical faces of peds; reddish brown (5YR 4/4) sand coats on some faces of peds along vertical cleavage planes in upper part of horizon; contains 8 to 10 percent gravel and cobblestones; few roots; medium acid; gradual wavy boundary.

IIB3t 69B260 84 to 109 cm (33 to 43 inches). Dark reddish brown (5YR 3/4) sandy loam; weak thick platy structure parting to somewhat weaker medium subangular blocky structure; friable; thin patchy clay films on plate surfaces; contains 8 to 10 percent gravel and cobblestones; few roots; slightly acid; gradual wavy boundary.

IIC 69B261 109 to 150 cm (43 to 60 inches). Reddish brown (5YR 4/4) sandy loam; weak thick platy structure; friable; contains 8 to 10 percent cobblestones and gravel; slightly acid; gradual wavy boundary.

*This pedon lacks an argillic horizon; therefore, it is a taxadjunct to the Magnor series.

SOIL Magnor taxadjunct SOIL Nos. 869WI-54-3 LOCATION Rusk County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 69B262 - 69B269

Depth (cm)	Horizon	181b Size class and particle diameter (mm) 3A1													3B2 Cm	Coarse fragments 3B1		
		Total			Sand				Silt		Int. II (2-0.1)	<.074 mm	Pct.	2A2		Pct. of < 76mm		
		Sand (2-0.05)	Silt (0.05-0.002)	Clay (< 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02				Int. III (0.02-0.002)			2-19	19-76
0-19	Ap	23.0	62.8	14.2	1.2	5.7	6.8	5.2	4.1	22.5	39.3	46.2	18.9	80.2	0.99	2	2	tr.
19-34	A2	32.9	55.3	11.8	1.8	7.5	9.6	8.1	5.9	30.0	25.3	39.5	27.0	71.6	0.99	1	1	tr.
34-46	A&B	38.5	53.3	8.2	1.6	8.5	11.9	10.5	6.0	42.7	10.6	53.6	32.5	65.7	0.97	5	3	2

Soil classification: Typic Glossoboralf; coarse-loamy, mixed.

Soil: Magnor taxadjunct*.

Soil No.: 869WI-54-3.

Location: Rusk County, Wisconsin; NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 4, T. 35 N., R. 6 W; 100 feet east and 150 feet north of intersection of fence line and road.

Climate: Humid continental; mean average temperature ranges from 41° to 45° F. Mean annual precipitation is 30 inches and frost-free season is about 125 days.

Vegetation and land use: Native vegetation was mixed northern hardwood forest with some pine. Principal species were oak, ash, elm, maple, aspen, and white pine. About 50 percent of this soil is used for cropland and livestock pasture. Corn, small grain, and forages are the principal crops.

Parent material: Thin loess mantle over acid sandy loam glacial till.

Physiography: Nearly level to sloping glacial till plain.

Topography: Site is in a slight depression on gently sloping relief.

Drainage: Somewhat poorly drained.

Ground water: Seasonally less than 3 feet from surface.

Erosion: Slight.

Permeability: Moderately slow.

Described by: Paul H. Carroll.

(Colors are for moist soil conditions unless otherwise noted)

Ap 69B262 0 to 19 cm (0 to 7 inches). Very dark grayish brown (10YR 3/2) silt loam, light gray (10YR 6/1) dry; weak fine subangular blocky structure; friable; many roots; strongly acid; clear smooth boundary.

A2 69B263 19 to 34 cm (7 to 13 inches). Brown (10YR 5/3) silt loam with many fine prominent mottles of strong brown (7.5YR 5/6-5/8); weak thin platy structure; friable; many roots; strongly acid; clear wavy boundary.

A&B 69B264 34 to 46 cm (13 to 18 inches). Variegated pinkish gray (7.5YR 6/2) to strong brown (7.5YR 5/8) silt loam; interfingers and tongues, 3 to 6 cm wide and with colors of pinkish gray (7.5YR 6/2-7/2), extend from the A2 horizon above into the argillic horizon below to occupy approximately 55 percent of the horizon body; weak medium platy structure in the A2 material and weak medium subangular blocky structure in the B2t material; friable; clay content in the B2t material is slightly higher than that in the tongues of A2; many roots; very strongly acid; clear wavy boundary.

IIB&A 69B265 46 to 62 cm (18 to 24 inches). Variegated brown (7.5YR 5/2) through strong brown (7.5YR 5/8) loam; interfingers and tongues of A2 material, brown (7.5YR 5/2) in color and 3 to 6 cm wide, extend deeply into this horizon and occupy about 25 percent of the horizon body; weak thin platy structure in the A2 material and weak medium subangular blocky structure in the B2t portion; friable; slightly higher clay content in the B2t than in the A2 portion of the horizon; common roots; strongly acid; clear wavy boundary.

IIB2tx 69B266 62 to 83 cm (24 to 32 inches). Dark reddish brown (5YR 3/4) sandy loam with few dark-colored manganese spots and occasional loamy sand tongues of reddish brown (5YR 5/4) that continue downward from the lower-chroma tongues above; moderate medium subangular blocky structure that displays weakly-expressed coarse platiness throughout; firm with fragic consistence; clay films are thin and continuous or nearly so on horizontal faces of peds and thin and patchy on vertical faces; small clay pockets or thick clay coatings on faces of peds are observed at the lower end of the tongues that terminate in this horizon; contains 10 to 12 percent gravel and cobblestones; common roots; strongly acid; clear wavy boundary.

IIB3 69B267 83 to 106 cm (32 to 42 inches). Reddish brown (5YR 4/4) and dark reddish brown (5YR 3/4) sandy loam; weak medium subangular blocky structure with weakly-expressed coarse platiness throughout; firm with fragic consistence; contains occasional thin clay films on ped faces and thin (1 to 2 cm) horizontal streaks of reddish gray (5YR 5/2) and pinkish gray (5YR 6/2) sandy clay loam that may represent illuviated material from the A2 tongues above; contains 10 to 12 percent gravel and cobblestones; few roots; medium acid; clear wavy boundary.

IIC1 69B268 106 to 124 cm (42 to 49 inches). Dark reddish brown (5YR 3/4) sandy loam; weak coarse platy structure; firm with fragic consistence; medium acid; contains 10 to 12 percent gravel and cobblestones; clear wavy boundary.

IIC2 69B269 124 to 150 cm (49 to 60 inches). Dark reddish brown (5YR 3/4) sandy loam; weak coarse platy structure; friable; contains 10 to 12 percent gravel and cobblestones; medium acid.

*This pedon is in a coarse-loamy family; therefore, it is a taxadjunct to the Magnor series.

SOIL CLASSIFICATION-TYPIC GLOSSOBORALF
COARSE-LOAMY, MIXED
SERIES - - - - - MARATHON

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MYSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S70W15-37-3 COUNTY - - - MARATHON

GENERAL METHODS - - - 1A, 1B1B, 2A1, 2B

SAMPLE NOS. 70L883-70L892

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO		
CM		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	INTR	FINE	NON-	BDI
		2-	.05-	LT	CLAY	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	2-	TO	CLAY	15-
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.002	2-.1	.02	CLAY	PCT	TO
		PCT LT 2MM															PCT	PCT	CLAY
000-17	AP	25.9	64.2	9.9	2.0	2.6	3.4	7.8	8.3	3.8	29.1	35.1		22.1	35.9				.67
017-25	A2	21.2	69.4	9.4	2.0	1.3	2.5	6.1	7.3	4.0	31.9	37.5		17.2	38.3	21			.54
025-46	A6B	19.7	70.1	10.2	1.8	.7	2.1	5.8	6.9	4.2	31.7	38.4		15.5	38.2	18			.47
046-73	B6A	25.4	63.5	11.1	2.6	1.3	3.1	7.4	8.8	4.8	30.5	33.0		20.6	38.1	23			.48
073-96	2B2T	74.2	11.9	13.9	9.0	24.8	17.8	8.2	15.1	8.3	6.3	5.6		65.9	22.7	65			.53
096-144	2B3T	80.2	10.9	8.9	5.5	25.6	21.1	9.7	16.0	7.8	5.7	5.2		72.4	21.7	62			.65
144-184	2C1	84.8	10.5	4.7	2.8	24.6	24.4	10.5	17.0	8.3	6.1	4.4		76.5	23.0	60			.77
184-234	2C2	81.3	12.9	5.8		14.6	21.6	12.4	21.2	11.5	7.2	5.7		69.8	30.2				.78
234-279	2C3	88.0	7.9	4.1	1.9	36.0	25.2	9.4	12.3	5.1	3.5	4.4		82.9	14.5	46			.68
000-17	AP (A)																		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2															BULK DENSITY			WATER CONTENT			CARBONATE			PH		
CM	VOL.	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	CM/	2	.002	H2O	CA	3A1A	3B1A	3B2A	3B3A	3B4A	3B5A	3B6A	3B7A
	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-17	1	0	0	TR	3	75	3	1.31	1.37	.015	27.8	25.7	6.6	.25	3.98				4.8	4.4							
017-25	TR	0	0	TR	1	81	1	1.50	1.53	.007	23.1	20.9	5.1	.23	3.08				5.0	4.2							
025-46	TR	0	0	TR	1	83	1	1.55	1.60	.011	23.5	20.5	4.8	.24	2.58				4.8	3.9							
046-73	1	0	0	TR	2	77	2	1.59	1.64	.010	22.3	19.6	5.3	.23	3.08				4.7	3.9							
073-96	34	0	0	17	31	16	48	1.46	1.52	.009	21.2	19.1	7.3	.11					4.7	4.0							
096-144	34	0	0	12	36	12	48	1.46	1.57	.016	19.1	16.6	5.8	.10					4.8	4.1							
144-184	41	0	0	19	38	9	57	1.44	1.55	.014	18.4	16.4	3.6	.13					5.1	4.3							
184-234	44	0	0	24	34	10	40						4.4						4.8	4.1							
234-279	37	0	0	16	35	7	51						2.8						5.1	4.4							
000-17	1	0	0	TR	2	2							6.3						4.8	4.3							

DEPTH (ORGANIC MATTER)			IRON	PHOS	(- -EXTRACTABLE BASES 5B4A- -)				ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)			
6A1A	6B1A	C/N	6C2B		6N2E	6O2D	6P2B	6Q2B		6H1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1	
ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUN	BACL	TEA	KCL	EXTB	NHAC	NHAC	SAT	EXTB	NHAC	
CARB			FE						EXTB			EXT	ACTY	TO	CA	NHAC	ACTY	NHAC	
CM	PCT	PCT	PCT	PCT	(- - - - -	- - - - -	- - - - -	- - - - -	-MEQ / 100	G- - - - -	- - - - -	- - - - -	- - - - -	) CLAY	MG	PCT	PCT	PCT	
000-17	2.25C	.166	14	1.1		4.3	0.6	0.1	0.2	5.2	12.8	0.9	18.0	11.4	1.15	7.2	38	29	46
017-25	0.79	.060	13	1.1		1.6	0.2	0.1	0.1	2.0	10.5	2.3	12.5	8.8	0.94	8.0	18	16	23
025-46	0.35	.030	12	1.1		0.9	0.2	0.1	0.1	1.3	9.3	3.6	10.6	8.0	0.78	4.5	11	12	16
046-73	0.19	.019		1.1		1.0	0.4	0.1	0.2	1.7	8.8	3.9	10.5	8.2	0.74	2.5	12	16	21
073-96	0.04			1.8		2.4	1.6	0.1	0.3	4.4	6.8	2.4	11.2	10.5	0.76	1.5	23	39	42
096-144	0.04			1.9		2.5	1.4	0.1	0.2	4.2	6.1	1.6	10.3	7.6	0.85	1.8	33	41	55
144-184	0.03			1.5		2.4	1.2	0.1	0.2	3.9	4.1	0.8	8.0	6.9	1.47	2.0	35	49	57
184-234	0.03			1.4		2.8	1.4	0.1	0.2	4.5	4.1	1.1	8.6	7.6	1.31	2.0	37	52	59
234-279	0.02			1.4		2.4	1.0	0.1	0.1	3.6	3.6	0.5	7.2	5.5	1.34	2.4	44	50	65
000-17	2.14	.159	13																

DEPTH	(SATURATED PASTE)										SATURATION EXTRACT 8A1-										ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6D1B	6P1B	6Q1B	6R1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2			
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	MG	NA	K	CO3	MC03	CL	SO4	NO3	LQ10	PLST			
	OMH-					SOLU		MMHOS/										LMIT	INOX			
CM			PCT	PCT		PPM	PCT	CM	(					MEQ / LITER				PCT	
000-17																		32D	4			
017-25																						
025-46	31000	4.7	27.0	1	1	20		.14	.5	.2	.4	0.1										
046-73																						
073-96																		23D				
096-144																						
144-184																						
184-234																						
234-279																						

000-17

- (A) COMPOSITE OF SEVERAL SURFACE SAMPLES.
(1) MICRO-PENETRATION RESISTANCE -A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 1/10-BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.
(C) ORGANIC CARBON IS 8 KG/M SQ TO A DEPTH OF 1 M (6A).
(D) DETERMINED BY SOIL MECHANICS LAB - SCS, LINCOLN, NE.

Soil classification: Typic Glossoboralf; coarse-loamy, mixed.

Soil: Marathon.

Soil No.: STOWI-37-3.

of intersection of Thornapple and County Highway O.

Climate: Humid continental; mean annual temperature is about 43° F; mean annual precipitation is about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Original vegetation was mixed hardwood and pine forests. Large areas of this soil are used for general farming. Principal crops are corn, small grain, and forages.

Parent material: Aeolian silt loam and very fine sandy loam over disintegrated and weathered granite.

Physiography: Rock-controlled uplands.

Topography: Site is on an east-facing convex slope of 5 percent.

Drainage: Well drained.

Ground water: Deep.

Erosion: None to slight accumulation.

Permeability: Moderate.

Described by Paul H. Carroll.

(Colors are for moist soils unless otherwise stated)

Ap 70L883 0 to 17 cm (0 to 7 inches). Dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; moderate fine subangular blocky structure; friable; many fine fibrous roots; 1 to 2 percent by volume of fine gravel from disintegrated granitic bedrock; neutral; abrupt smooth boundary.

A2 70L884 17 to 25 cm (7 to 10 inches). Brown (10YR 5/3) silt loam marginal to silt; weak fine platy structure; friable; common fine fibrous roots; 1 to 2 percent by volume of fine gravel from disintegrated granitic bedrock; medium acid; abrupt smooth boundary. (See Remarks)

AAB 70L885 25 to 46 cm (10 to 18 inches). Brown (10YR 5/3) silt loam marginal to silt (A2); weak thin platy structure; very friable; occupies about 80 percent of the horizon and completely surrounds or tongues into remnants of underlying Bt; brown (7.5YR 5/4) and dark brown (7.5YR 4/4) silt loam (Bt); weak fine subangular blocky structure; friable; common fine fibrous roots; few thin clay films on faces of peds in Bt remnants and in some pores; 1 to 2 percent by volume of fine gravel from disintegrated granitic bedrock; very strongly acid; clear wavy boundary. (See Remarks)

BAA 70L886 46 to 73 cm (18 to 29 inches). Dark yellowish brown (10YR 4/4) and dark brown (7.5YR 4/4) silt loam (Bt); moderate medium subangular blocky structure; friable; occupies about 60 percent of the horizon and consists of upward extensions of the underlying Bt horizons; common thin clay films on faces of peds and in tubular pores; tongues of brown (10YR 5/3) silt loam marginal to silt (A2); weak thin platy structure; very friable; few fine fibrous roots; 1 to 2 percent by volume of fine gravel from disintegrated granitic bedrock; very strongly acid; clear wavy boundary. (See Remarks)

IIB2t 70L887 73 to 96 cm (29 to 38 inches). Dark brown (7.5YR 4/4) and brown (7.5YR 5/2-5/3) very gravelly sandy loam; weak medium subangular blocky structure; firm; many thin dark brown (7.5YR 3/2) clay films on faces of

pebbles and as bridging of sand grains; 70 to 80 percent by volume of fine angular and subangular gravel from disintegrated granitic bedrock; very strongly acid; clear wavy boundary.

IIB3t 70L888 96 to 144 cm (38 to 57 inches). Dark brown (7.5YR 4/4), strong brown (7.5YR 5/6-5/8) and yellowish red (5YR 5/6-5/8) very gravelly sandy loam; weak coarse subangular blocky structure; firm; common thin dark brown (7.5YR 3/2) clay films on faces of pebbles and as bridging of sand grains; 80 percent by volume of fine angular and subangular gravel from disintegrated granitic bedrock; strongly acid; gradual wavy boundary.

IIC1 70L889 144 to 184 cm (57 to 72 inches). Strong brown (7.5YR 5/6-5/8) loamy fine angular and subangular gravel from disintegrated granitic bedrock; weak coarse subangular blocky structure; firm; common thin dark brown (7.5YR 3/2) clay films on faces of angular and subangular pebbles at upper boundary, becoming fewer with depth; strongly acid; gradual wavy boundary.

IIC2 70L890 184 to 234 cm (72 to 92 inches). Strong brown (7.5YR 5/6-5/8) fine angular and subangular gravel from disintegrated granitic bedrock; massive; slightly acid; gradual wavy boundary.

IIC3 70L891 234 to 279 cm (92 to 109 inches). Strong brown (7.5YR 5/6-5/8) fine angular and subangular gravel

SOIL CLASSIFICATION-TERRIC BOROSAPRIST
SANDY OR SANDY-SKELETAL, MIXED, EUIC
SERIES - - - - -PARKEY

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, WISC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S74WI-83-2 COUNTY - - - OCONTO

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 74L872-74L877

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -														RATIO			
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	VFNS	CSOI	FNSI	VFSI	SAND	INTR	FINE	NON-	SDI
		2-	.05-	LT	LT	2-	1-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY	CO3-
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.005	.10	.02	CLAY	TO	BAR
		PCT LT 2MM - - - - -														PCT	PCT	PCT	CLAY

000-018	OAP																		
018-036	CA2																		
036-050	CA3																		
050-084	CA4																		
084-100	CA5																		
100-150	2C	91.1	7.3	1.6		.5	7.5	27.4	42.8	12.9	6.0	1.3			78.2				

DEPTH	PARTICLE SIZE ANALYSIS, MM, 30, 301, 302														BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	VOL.	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	6E1B	3A1A	8C1A	8C1E					6E1B	3A1A	8C1A	8C1E	1/1	1/2
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-018	TR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
018-036	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
036-050	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
050-084	TR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
084-100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100-150	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

DEPTH	ORGANIC MATTER				IRCN	PHOS	EXTRACTABLE BASES 5B4A-				ACTV	AL	CAT EXCH				RATIO	RATIO	CA	(BASE	SAT)
	6A1A	6B1A	C/A	6C2B	EXT	TOTL	6N2E	6O2D	6P2B	6Q2B	SUM	6H1A	6G1E	6A3A	6A6A	8D1	8D3	5F1	5C3	5C1	
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	
000-018	41.9	2.55	16				125	26.4	.2	.7	152	42.7		195	140		4.7	89	78	109	
018-036	39.1	2.26	17				126	26.6	.2	.3	153	49.9		203	146		4.7	86	75	105	
036-050	37.6	1.95	19				128	30.1	.3	.1	159	63.9		222	145		4.3	88	71	109	
050-084	37.7	2.02	19				104	24.7	.3	.1	129	54.7		184	115		4.2	90	70	112	
084-100	25.1	1.84	14				31.0	8.3	.2	TR	39.5	40.8		80.3	37.7		3.7	82	49	105	
100-150	.19	.009						2.7	TR	TR		1.1					1.4		85		

DEPTH	(SATURATED PASTE)				NA	SE	SALT	GYP	SATURATION				EXTRACT				ATTERBERG			
	8E1	8C1B	8A	5D2	5E	TOTL	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2
CM	REST	PH	H2O	ESP	SAR	EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3	LOID	PLST	LOID	PLST	
000-018	750	5.7	238			5400		3.41	22.9	11.4	.4	.6	0	1.2	.2	5.4	30.0			
018-036	1300	5.8	281			2700		1.45	9.8	4.9	.3	.1	0	1.2	.2	3.4	12.0			
036-050	1700	6.0	444			2400		.02	5.3	2.9	.3	.0	0	.9	.2	4.3	3.6			
050-084	1600	5.8	467			3300		.95	6.9	4.0	.3	.0	0	.6	.5	8.9	1.9			
084-100	620	4.4	384			11000		2.99	28.0	17.0	.4	TR	0	.9	.2	47.0	.0			
100-150	2400	6.9	24.0			490		2.35	17.7	13.9	.3	TR	0	.9	.5	32.6	.0			

DEPTH	HISTOSOL CHARACTERIZATION														WATER CONTENT				ATTERBERG	
	8F	8G	8H	8C1E	4A3A	4A1I	4D1	RE-	STAT	RENT	WET	RES-	FILED	1/3B	15-	WRD	CM	CM	CM	CM
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-018	29	23A	3	7.5YR	2/2	5.8	.29	.34	.31	76	179		77.5							
018-036	30	12	3	10YR	2/2	5.9	.32	.41	.24	84	203		73.1							
036-050	19	30	1	10YR	4/2	5.9	.20	.41	.24	90	393		65.2							
050-084	28	29A	1	7.5YR	4/2	5.3	.21	.34	.25	84	385		67.7							
084-100	30	10	1	7.5YR	3/2		.18	.36	.29	70	456		53.3							

Soil classification: Terric Borosapristis; sandy or sandy-skeletal, mixed, euic.

Series: Markey.

Pedon No.: S74WI-83-2.

Location: Oconto County, Wisconsin; NW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 26, T. 29 N., R. 20 E.; 300 feet east of U.S. Highway 141 and 75 feet north of drainage ditch. About 45.0° north latitude and about 88.0° west longitude.

Climate: Humid continental. Mean annual temperature is 44.9° F mean July temperature is 70.9° F mean January temperature is 18.6° F.; mean annual precipitation is 27.05 inches with nearly two-thirds of the precipitation falling during the growing season; total amount of snowfall is 39.8 inches; the growing season averages 133 days, but less in organic soil areas. (Data from Oconto, weather bureau substation.)

Parent material: Deposits of herbaceous organic material 16 to 50 inches thick over sandy mineral deposits.

Physiography: Level glacial depression along a major drainageway.

Vegetation: Area sampled was in potatoes. Native vegetation was white cedar.

Size of area: About 200 acres.

Distance to adjacent mineral soil: About 200 feet to the west is a sand island.

Depth to water table: 76 cm.

Microrelief: None.

Subsidence: Estimated as moderate.

Soil temperature: Measured soil temperature at 15.5° C at 50 cm.; 13.7° C at 70 cm.

Described and sampled by: G.W. Hudelson, W.C. Lynn, W.E. McKinzie, H.E. Lorenz, G.B. Lee, and A.J. Klingelhoets on August 6, 1974. Samples were obtained from a pit.

Oap 74L872 0 to 18 cm. Black (7.5YR 2/1) broken face, rubbed or pressed sapric material; about 5 percent fibers undisturbed, less than 1 percent rubbed; weak medium and fine subangular blocky structure parting to weak fine granular structure; very friable; fibers primarily herbaceous, about 20 percent mineral soil material; common fine roots; pH 8.0 (Truog); abrupt smooth boundary.

Oa2 74L873 18 to 36 cm. Black (7.5YR 2/1) broken face, rubbed, or pressed, sapric material; about 10 percent fibers undisturbed, less than 5 percent rubbed; weak fine subangular blocky structure; very friable; fibers primarily herbaceous; about 25 percent mineral soil material; common fine roots; pH 7.5 (Truog); clear smooth boundary.

Oa3 74L874 36 to 50 cm. Black (7.5YR 3/1), black (10YR 2/1) rubbed or pressed, sapric material; about 25 percent fibers, less 5-10 percent rubbed; weak moderate subangular blocky structure; fibers are primarily herbaceous, about 10 percent cedar wood fragments; about 25 percent mineral soil material; few fine roots; pH 7.5 (Truog); clear smooth boundary.

Oa4 74L875 50 to 84 cm. Very dark brown (7.5YR 3/2), black (7.5YR 2/1) rubbed or pressed sapric material; about 20 percent fibers, less than 5 percent rubbed; weak coarse platy structure; fibers primarily herbaceous with thin, less than 1/4 inch thick medium and fine sand layers about 20 percent of the soil.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 74L884-74L890

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B													RATIO			
		FINE (-)			SAND			SILT (-)			INTR			NON-801				
		SAND	SILT	CLAY	CLAY	VCCS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	INTR	FINE	NON-	801
		2-	.05	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY	15-
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	TO	CLAY
CM		(-) PCY LT 2MM (-) PCY													PCY	PCY	PCY	CLAY

000-023	CAP											
023-043	CA2											
043-058	CCN1	41.8	49.1	9.1	.6	7.4	11.0	12.9	9.9	17.8	31.3	31.9
058-086	CA3											
086-089	CCN2	50.8	47.8	1.4	1.4	12.1	12.1	15.1	10.1	9.1	38.7	40.7
089-104	CA4											
104-152	2C	96.7	2.2	1.1	.1	13.0	36.9	35.0	11.7	2.2	7R	85.0

DEPTH (PARTICLE SIZE ANALYSIS, MM, 30, 301, 302) (BULK DENSITY) (- - - WATER CONTENT - - -) CARBONATE (- - PH - -)																	
VOL. (- - - - - WEIGHT - - - - -)										4A1D 4A1H 4D1 4B1C 4B1C 4B2A 4C1				6E1B 3A1A 8C1A 8C1E			
GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN COLE	1/10	1/3-	15-	NRD	LT	1/1	1/2		
2	75				.074	PCT	BAR	DRY	BAR	BAR	BAR	CM/	2	.002	H2O	CACL	
CM	PCT	PCT	(- - - PCT	LT 75 - - -)	LT20	G/CC	G/CC		PCT	PCT	PCT	CM	PCT	PCT			
C00-023	TR	0	0	0	TR		.49	.77	146	138	53.3	.46			5.0	4.6	
023-043	0	0	0	0	0		.24	.55	383	324	81.4	.60			5.0	4.6	
043-058	0	0	0	0	0		.59	.65	131	126	42.4	.53			6.5	6.1	
058-086	0	0	0	0	0		.20	.66	437	421	88.7	.70			5.9	5.6	
086-089	0	0	0	0	0						47.3				7.4	7.3	
089-104	0	0	0	0	0		.16	.56	560	534	66.7	.79			6.1	5.1	
104-152	TR	0	0	TR	TR						1.0				6.3	5.9	

[illegible][illegible][illegible]

Soil classification: Terric Borosaprist; ferrihumic, euic.

Series: Markey, bog iron variant.

Pedon No.: S74WI-83-4.

Location: Oconto County, Wisconsin; SW¹/₄, SE¹/₄, Sec. 4, T. 30 N., R. 18 E., 250 feet east (opposite machine shed) of farm lane. About 45.1° north latitude and about 88.2° west longitude.

Climate: Humid continental. Mean annual temperature is 43.4° F; mean July temperature is 69.6° F; mean January temperature is 15.6° F; mean annual precipitation is 27.94 inches with nearly two-thirds of the precipitation falling during the growing season; total amount of snowfall is 47.9 inches; the growing season averages 119 days, but less in the organic areas (data from Crivitz High Fall, WI weather bureau substation).

Parent material: Deposits of herbaceous organic material 16 to 50 inches thick over sandy mineral deposits. Organic material contains limonite layer.

Physiography: Large glacial lake basin with many scattered sand "islands."

Vegetation: Area sampled was in potatoes and Cris variety of spring wheat.

Size of area: About 500 acres.

Distance to adjacent mineral soil: 300 feet to west.

Depth to water table: 120 cm.

Microrelief: None.

Subsidence: Estimated as moderate.

Soil Temperature: Measured soil temperature was 14.0° C at 60 cm and 10.0° C at 110 cm.

Described and sampled by: G.W. Hudelson, W.C. Lynn, W.E. McKinzie, H.E. Lorenz, G.B. Lee, and A.J. Klingelhoets on August 6, 1974. Samples were obtained from pit.

Oap 74L884 0 to 23 cm. Black (10YR 2/1) broken face, rubbed, pressed sapric material; about 10 percent fiber, less than 5 percent rubbed; weak coarse subangular blocky structure and weak fine granular structure; very friable; fibers primarily herbaceous; about 20 percent mineral soil material; many roots; pH 5.5 (Truog); abrupt smooth boundary.

Oa2 74L885 23 to 43 cm. Black (10YR 2/1) broken face, rubbed, or pressed sapric material; about 15 percent fiber, less than 5 percent rubbed; weak coarse prismatic structure parting to weak medium subangular blocky structure; friable; fibers primarily herbaceous; about 25 percent mineral soil material; common roots; pH 7.0 (Truog); abrupt wavy boundary.

Cen1 74L886 43 to 58 cm. Strong brown (7.5YR 5/6 & 5/8) limonite; massive; firm; few roots; moderately alkaline, violent effervescence; abrupt wavy boundary.

Oa3 74L887 58 to 86 cm. Black (10YR 2/1) broken face and rubbed, very dark brown (10YR 2/2) pressed

herbaceous; about 20 percent mineral soil material; pH 6.0 (Truog); clear smooth boundary.

Cen2 74L888 86 to 89 cm. Dark yellowish brown (7.5YR 4/4) limonite; massive; firm; moderately alkaline, violent effervescence; abrupt wavy boundary.

Oa4 74L889 89 to 104 cm. Dark brown (7.5YR 3/2), black (7.5YR 2/1) rubbed or pressed sapric material;

SOIL CLASSIFICATION-AQUIC GLOSSOBRALP
 FINE-LOAMY, MIXED
 SERIES - - - - -MILLADORE TAXADJUNCT.

U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE, MTSC
 NATIONAL SOIL SURVEY LABORATORY
 LINCOLN, NEBRASKA

SOIL NO - - - - - STOWIS-37-2 COUNTY - - - MARATHON

GENERAL METHODS- - -1A,1B18,2A1,2B

SAMPLE NOS. 70L870-70L882

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO			
		SAND	SILT	CLAY	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	TEXT	INTR	FINE	NON-	801		
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	.2-	TO	CLAY	CO3-	15-	
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY	TO	TO	BAR	
		PCT LT 2MM															PCT	PCT	CLAY	

025-35	A2	11.2	72.9	15.9	4.9	.1	.7	1.3	2.0	7.1	40.2	32.7	4.1	48.2	31				.44
035-50	A6B	10.9	68.8	20.3	8.6	.1	.7	1.3	1.7	7.1	40.2	28.6	3.8	48.1	42				.42
050-67	B6A	19.6	60.9	19.5	8.4	.6	2.2	3.2	4.4	9.2	37.4	23.5	10.4	48.5	43				.42
067-90	162B21T	47.9	38.4	13.7		3.8	7.0	10.9	14.6	11.6	22.8	13.6	36.3	40.8					.42
090-123	2022T	52.7	29.5	17.8	13.0	2.7	7.1	12.7	20.1	10.1	16.2	13.3	42.6	35.3	73				.41
123-162	2B3T	57.4	24.5	18.1	12.0	5.9	10.5	12.6	19.4	9.0	11.5	13.0	48.4	29.4	86				.46
162-196	2C1	73.3	19.1	7.6	4.6	13.5	18.0	13.2	19.9	8.7	9.4	9.7	64.6	27.2	61				.78
196-237	2C2	75.9	19.1	5.0		13.3	19.1	10.4	20.1	11.0	10.3	8.8	64.9	31.9					1.06
237-287	2C3	82.7	14.4	2.9		15.6	25.6	11.6	20.0	9.9	8.6	5.8	72.8	28.7					1.10
287-370	2C4	80.8	15.1	4.1		18.9	24.3	10.6	18.0	9.0	7.9	7.2	71.8	25.9					1.00
000-25	AP (A)																		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	VOL. 1 - - - - -					WEIGHT - - - - -					4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E13	3A1A	8C1A	8C1E			
	GT	75	20	5	2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2						
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/	2	.002	H2O	CACL						
CN	PCT	PCT	(- - -	PCT	LT	75 - - -)	LT20	G/C	G/C		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT			
000-15	TR	0	TR	TR	TR	93	TR	1.37	1.40	.007	30.2	28.0	7.4	.28	3.6C			4.8	4.5					
015-25	TR	0	0	TR	TR	94	TR	1.34	1.40	.015	31.4	29.8	7.1	.31	3.6C			4.9	4.5					
025-35	TR	0	0	0	TR	95	TR	1.50	1.56	.014	26.1	23.2	7.0	.25	3.0C			4.8	4.2					
035-50	TR	0	0	TR	TR	95	TR	1.49	1.57	.018	26.2	23.4	8.5	.23	2.5C			4.6	4.1					
050-67	TR	0	0	TR	TR	88	TR	1.50	1.62	.027	24.0	21.3	8.2	.20	2.6C			4.6	4.1					
067-90	2	0	0	2	1	60	3	1.708					6.6					4.5	4.0					
090-123	1	0	TR	1	1	52	2	1.78	1.90	.023	16.7	14.8	7.3	.14	2.6C			4.9	4.3					
123-162	2	0	TR	1	2	45	3	1.76	1.87	.019	18.5	16.9	8.3	.14	3.0C			5.2	4.4					
162-196	TR	0	0	TR	1	31	1	1.808					5.9					5.4	4.7					
196-237	8	0	0	TR	11	26	11	1.808					5.3					5.5	4.7					
237-287	21	0	0	TR	29	15	29	1.73	1.97	.033	17.2	14.7	3.2	.15				6.2	5.2					
287-370	21	0	0	2	28	17	30	1.708					4.1					5.5	4.9					
000-25	TR	0	TR	0	TR		TR						10.7					4.6	4.3					

DEPTH	ORGANIC MATTER			IRON C/N	PHOS EXT TOTL	EXTRACTABLE BASES 5B4A-				ACTY 6H1A BACL TEA	AL 6G1E KCL EXT	CAT 5A3A NHAC ACTY	EXCH 5A6A NHAC TO CLAY	RATIO 8D1 NHAC TO MG	RATIO 8D3 CA TO MG	CA 5F1 SAT NHAC	(BASE 5C3 EXTB ACTY	SAT 5C1 NHAC PCT	
	6A1A	6B1A				6N2E	6O2D	6P2B	6Q2B										
	ORGN	NITS				CA	MG	NA	K										
	CARB PCT	PCT							SUM EXTB / 100										
CM	PCT	PCT		PCT	PCT	(-	-	-	-	-	-	-	-	-	-	-	-	
000-15	1.880	.173	11	0.9		5.7	0.9	0.3	0.2	7.1	12.2	0.4	19.3	14.1	1.21	6.3	40	37	50
015-25	1.61	.156	10	1.0		5.7	0.9	0.2	0.1	6.9	8.0	0.4	14.9	13.8	1.17	6.3	41	46	50
025-35	0.31	.037	8	1.1		5.8	1.2	0.2	0.2	7.4	8.3	1.1	15.7	11.6	0.73	4.8	50	47	64
035-50	0.20	.027		1.3		6.4	1.7	0.2	0.3	8.6	9.8	2.0	18.4	14.1	0.69	3.8	45	47	61
050-67	0.15	.021		1.2		6.1	1.9	0.1	0.3	8.4	8.8	1.9	17.2	13.3	0.68	3.2	46	49	63
067-90	0.07			1.3		5.8	2.0	0.2	0.3	8.3	8.4	1.1	14.7	12.1	0.77	2.9	48	54	69
090-123	0.07			1.3		7.3	2.6	0.1	0.2	10.2	6.1	0.9	16.3	12.4	0.70	2.8	59	63	82
123-162	0.07			1.3		10.7	3.4	0.3	0.2	14.6	6.5	0.7	21.1	15.9	0.88	3.1	67	69	92
162-196	0.03			0.9		8.5	2.3	0.3	0.2	11.3	4.2	0.5	15.5	13.6	1.79	3.7	63	73	83
196-237	0.03			0.7		8.7	2.3	0.3	0.2	11.5	3.5		15.0	13.3	2.66	3.8	65	77	86
237-287	0.02			0.7		5.3	1.6	0.2	0.2	7.3	1.4		8.7	7.3	2.52	3.3	73	84	100
287-370	0.03			0.7		6.2	1.9	0.2	0.2	8.5	1.5		10.0	9.3	2.27	3.3	67	85	91
000-25	1.69	.161	10																

DEPTH	SATURATED PASTE			NA	NA	SALT	GYP	SATURATION EXTRACT 8A1-										ATTERBERG	
	8E1	8F1A	8A	8D2	8E	8H4	8F1A	8A1A	8A1B	8A1C	8A1D	8A1E	8A1F	8A1G	8A1H	8A1I	8A1J	4F1	4F2

Soil classification: Aquic Glossoboralf; fine-loamy, mixed.

Soil: Milladore taxadjunct*.

Soil No.: S7OWI-37-2.

Location: Marathon County, Wisconsin; S½, SW¼, Sec. 24, T. 26 N., R. 4 E., 130 feet east of fence, directly north of elm trees.

Climate: Humid continental; mean annual temperature is about 43° F; mean annual precipitation is about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Original vegetation was mixed northern hardwoods and pine forest. Many areas have been cleared and are being used for cropland or pasture.

Parent material: Loess over residuum from highly micaceous gneissic rocks.

Physiography: Nearly level to gently sloping areas in rock-controlled uplands.

Topography: Site is in a 1 percent plane slope in an idle field.

Drainage: Somewhat poorly drained.

Ground water: Deep - a perched water table occurs within 2 feet of the surface for short periods during wet seasons.

Erosion: Slight.

Permeability: Moderate.

Described by: Paul H. Carroll.

(Colors are for moist soils unless designated otherwise).

Ap1 70L870 0 to 15 cm (0 to 6 inches). Dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine subangular blocky structure; friable; many fine fibrous roots; strongly acid; abrupt smooth

boundary.

Ap2 70L871 15 to 25 cm (6 to 10 inches). Dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium platy structure parting to weak very fine subangular blocky structure; friable; many fine fibrous roots; strongly acid; abrupt smooth boundary.

A2 70L872 25 to 35 cm (10 to 14 inches). Brown (10YR 5/3) silt loam with common fine prominent mottles of strong brown (7.5YR 5/6-5/8) and yellowish brown (10YR 5/6-5/8); weak thin platy structure; friable; common fine fibrous roots; strongly acid; clear wavy boundary. (See Remarks)

A&B 70L873 35 to 50 cm (14 to 20 inches). Dark yellowish brown (10YR 4/4) silt loam (Bt) with many fine and medium distinct and prominent mottles of strong brown (7.5YR 5/6-5/8) and few fine distinct mottles of grayish brown (10YR 5/2); weak fine subangular blocky structure; friable; thick brown (10YR 5/3) tongues of light silt loam penetrate this horizon from the A2 above and occupy approximately 70 percent of the horizon; very friable; few fine

B&A 70L874 50 to 67 cm (20 to 26 inches). Yellowish brown (10YR 5/6) heavy silt loam (Bt) with many fine distinct and prominent mottles of strong brown (7.5YR 5/6-5/8) and light brownish gray (2.5Y 6/2); moderate fine and medium subangular blocky structure; friable; tongues of grayish brown (10YR 5/2) silt loam penetrate this horizon from above and occupy approximately 40 percent of the horizon; common thin clay films are on surfaces of peds and in tubular pores of the Bt portion; very strongly acid; clear wavy boundary. (See Remarks)

IIB21t 70L875 67 to 90 cm (26 to 35 inches). Dark brown (7.5YR 4/4) gravelly loam with common medium distinct and prominent mottles of strong brown (7.5YR 5/6-5/8); moderate medium subangular blocky structure; firm; common thin clay films on faces of peds and in continuous tubular pores and as clay bridging of sand grains; patchy thin coatings of uncoated silt and very fine sand on faces of some peds near upper boundary; horizon has gravel accumulation consisting of 15 percent by volume of fine subangular rock fragments 20 to 75 mm in diameter, approximately the same amount between 2 and 75 mm diameter; very strongly acid; clear wavy boundary.

IIB22t 70L876 90 to 123 cm (35 to 48 inches). Dark brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) light sandy clay loam with few medium distinct mottles of strong brown (7.5YR 5/6); moderate medium and coarse angular blocky structure; firm; common thin clay films on faces of peds and in tubular pores and clay bridging of sand grains; 1 to 2 percent by volume of rock fragments 20 to 75 mm diameter, 5 to 10 percent fragments 2 to 75 mm in diameter; very strongly acid; gradual wavy boundary.

SOIL CLASSIFICATION-AQUIC GLOSSOBORALF
COARSE-LOAMY, MIXED
SERIES - - - - - MONICO TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 72L843-72L849

DEPTH HORIZON (- - - - - PARTICLE SIZE ANALYSTS. LT 2MM. 3A1. 3A1A. 3A1R - - - - - RATIO

CM		SAND 2- .05	SILT .05- .002	CLAY LT .002	CLAY LT .0002	VCOS 1	CORS 1- .5	HEDS .5- .25	PHES .10- .10	VPMS .05	COSI .02	PHSI .002	VPSI .002	SAND 2- .10	II .02	CLAY TO CLAY PCT	CO3- CLAY PCT	15- BAR TO CLAY PCT
000-6	A1	55.4	32.1	12.5	5.4	1.8	7.9	14.4	21.8	9.5	14.7	17.4		45.9	34.9	43		1.00
006-25	A2	56.8	35.7	7.5	3.5	2.0	8.6	15.7	21.6	8.9	16.2	19.5		47.9	35.4	47		.48
025-48	B2H1R	64.0	27.0	9.0	2.7	1.9	8.9	16.7	25.4	11.1	14.7	12.3		52.9	38.2	30		.59
048-65	A'2	68.2	26.4	5.4	1.6	2.1	10.0	21.2	25.6	9.3	14.7	11.7		58.9	34.6	30		.44
065-85	B'21	78.8	15.8	5.4	1.6	2.0	10.6	23.4	31.6	11.2	10.1	5.7		67.6	35.5	30		.37
085-120	B'22T	52.4	37.8	9.8	2.1	1.3	7.3	15.8	17.8	10.2	21.7	16.1		42.2	39.1	21		.41
120-170	C	78.9	15.0	6.1	1.4	4.4	14.6	23.1	26.8	10.0	7.6	7.4		68.9	29.0	23		.31

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 3E, 3E1, 3E2) (BULK DENSITY) (- - - WATER				CONTENT- - -)				CARBONATE (- PH -)			
	VOL. (- - - - - WEIGHT - - - - -)										4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	621B	3A1A	8C1A	8C1E	
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD		LT	LT	1/1	1/2			
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CH/		2	.002	H2O	CACL			
CM	PCT	PCT	(- - - PCT	LT 75	- - -)	LT20	G/CC	G/CC			PCT	PCT	PCT	CM		PCT	PCT					
000-6	2	0	TR	1	2	48	3	.9	A						12.5			4.4	4.1			
006-25	1	0	TR	1	1	47	2	1.1	A						3.6			4.6	3.9			
025-48	2	0	TR	1	2	41	3	1.3	A						5.3			4.3	4.2			
048-65	2	0	TR	1	2	36	3	1.65	1.68	.006	16.5	13.9	2.4	.04	2.3B			5.1	4.3			
065-85	5	0	5	4	3	24	7	1.7	A						2.0			5.3	4.5			
085-120	5	0	5	1	2	50	3	1.71	1.75	.008	15.9	13.0	4.0	.15	4.4B			5.1	4.1			
120-170	15	TR	5	9	6	21	17	1.77	1.84	.012	12.3	8.8	1.9	.11	1.4B			5.3	4.4			

DEPTH	(ORGANIC MATTER)		IBOW	PHOS	(- - - EXTRACTABLE BASES 5B4A- -)				ACTY	AL	(CAT EXCH)	RATIO	RATIO	CA	(BASE SAT)				
CM	6A1A	6B1A	C/N	6C2B	6N2B	6O2D	6P2B	6Q2B	6H1A	6G1B	5A3A	5A6A	8D1	8D3	5P1	5C3	5C1		
CM	ORGN	NTGC		EXT	TOTL	CA	MG	NA	K	SHH	RACL	KCL	EXTR	MMAC	NHAC	CA	SAT	EXTB	NHAC

CM	CARB PCT	PCT	FE PCT	PCT (-	-	-	-	-	-	-	-	-	HEQ / 100	TEA G-	EXT -	ACTY -	TO CLAY	TO NG	NHAC PCT	ACTY PCT	PCT
000-6	12.60	.450	28	1.1		4.6	.9	.1	.3	5.9	19.8	1.1	25.7	19.8	1.58	5.1	23	23	30		
006-25	.95	.082	12	.7		1.0	.2	.1	.1	1.4	8.3	2.0	9.7	6.7	.89	5.0	15	14	21	21	
025-48	.95	.071	13	1.3		.5	.1	.1	.1	.8	15.5	2.5	16.3	9.2	1.02	5.0	5	5	9	9	
048-65	.12			.9		.5	.2	.1	.1	.9	6.1	1.7	7.0	4.8	.89	2.5	10	13	19		
065-85	.08			.8		.7	.4	TR	.1	1.2	4.0	1.1	5.2	3.9	.72	1.8	18	23	31	31	
085-120	.08			1.0		2.1	1.1	.1	.1	3.4	5.9	1.6	9.3	7.3	.74	1.9	29	37	47	47	
120-170	.01			.6		.9	.4	TR	.1	1.4	2.2	.3	3.6	2.6	.43	2.3	35	39	54	54	

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	(- - - - - SATURATION EXTRACT 8A1- - - - -)										ATTERBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6P1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4P1	4P2	
	EXT	PH	H2O	ESP	SAR	TOTL	EC	CA	MG	NA	K	CO3	HCO3	CL	SO4	NO3		LQID	PLST	
	OHM~					SOLU	MMHOS/												LNIT	INDX
CM	CM	PCT	PCT			PPH	PCT	CM	(- - - - - HEQ / LITER - - - - -)										PCT	

000-6																				
006-25																				
025-48																				
048-65																				
065-85																				
085-120	14000	4.8	23.9																	
120-170																				

IDENTIFICATION OF THE SPODIC HORIZON BY LABORATORY CRITERIA.

DEPTH	HORIZON	(PYROPHOSPHATE,PH10)		(CIT - DIT)		(PYROPHOSP)		PYRO	CEC	
		6C5A	6G5A	6A1B	6C2B	6G7A	FE+AL	AL+C	FE+AL	-1/2
		EXT	EXT	EXT	EXT	EXT	/	/	/	CLAY
		FE	AL	C	FE	AL	CLAY	CLAY	C - D	X
PCT	PCT	PCT	PCT	PCT	PCT	FE+AL		FE+AL	THIC	
025-48	B2H1R	.6	.3		1.3	.3	.10		.56	108

Soil classification: Aquic Glossoboralf; coarse-loamy, mixed.

Soil: Monico taxadjunct*.

Soil No.: S72WI- 21-5 (LSL Nos. 72L843-72L849).

Location: Forest County, Wisconsin; SW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 32, T. 38 N., R. 12 E.; near State Highway 32, Argonne Experimental Forest.

Climate: Humid continental; mean annual temperature is about 41° to 45° F; mean annual precipitation is about 30 inches; and frost-free season is about 130 days.

Vegetation and land use: Natural vegetation was northern hardwoods. Most of this soil is in forest. A few small areas are cleared and used for general farming. Some wooded areas are pastured.

Parent material: Sandy loam glacial till.

Physiography: Nearly level to gently sloping areas on glacial ground moraines.

Topography: Site is on 1 percent plane slope.

Drainage: Somewhat poorly drained.

Ground water: A perched water table exists within 20 inches of the surface for short periods during wet seasons.

Erosion: Slight.

Permeability: Moderately slow.

Described by: Robert Fox and Steve Payne.

(Colors are for moist soil unless otherwise stated)

A1 72L843 0 to 6 cm (0 to 2.5 inches). Black (5YR 2/1) sandy loam; weak fine granular structure; very friable; many roots; strongly acid; abrupt boundary.

A2 72L844 6 to 25 cm (2.5 to 10 inches). Reddish gray (5YR 5/2) sandy loam; weak fine platy structure; friable; few roots; strongly acid; abrupt boundary.

B2h1r 72L845 25 to 48 cm (10 to 19 inches). Dark reddish brown (5YR 3/4) sandy loam; weak fine subangular blocky structure; very friable; many fine and medium roots; strongly acid; clear boundary.

A'2 72L846 48 to 65 cm (19 to 26 inches). Reddish gray (5YR 5/2) sandy loam; weak fine subangular blocky structure parting to weak thin platy structure; friable, brittle; few fine pores; few roots; strongly acid; clear boundary.

B'21 72L847 65 to 85 cm (26 to 34 inches). Reddish brown (5YR 4/3) loamy sand with common medium prominent mottles of yellowish red (5YR 5/6) and reddish brown (5YR 5/4); weak fine subangular blocky structure; friable, brittle; about 5 percent fine gravel; strongly acid; clear boundary.

B'22t 72L848 85 to 120 cm (34 to 48 inches). Yellowish red (5YR 4/6) sandy loam with many medium and large prominent and distinct mottles of grayish brown (10YR 5/2) and yellowish red (5YR 5/6); weak fine platy structure; friable; about 5 percent fine gravel; strongly acid; clear boundary.

C 72L849 120 to 170 cm (48 to 68 inches). Reddish brown (5YR 4/3) sandy loam; massive; very friable, brittle, weakly cemented; about 5 percent fine gravel and about 10 percent medium gravel; strongly acid.

Remarks: The surface is covered by a thin layer, about 2 cm thick, of partially decomposed leaves and twigs from the timber growing in the area. The microrelief is hummocky with considerable tree throw in the vicinity of the sample. There are a few stones on the surface and some boulders up to 3 feet in diameter.

*This pedon has an argillic horizon; therefore it is a taxadjunct to the Monico series.

S49WI-16-1

Beltsville Soil Survey Lab. Nos. 49982-49989

Depth cm	Horizon	M.E./100 Grams Soil						% B. SAT	pH	% O.C.	Size Classes %							
		Ca	Mg	K	Na	P ¹	S ²				Clay	III ³	USDA Silt	VFS	FS	MS	CS	VCS
0-5	A1	4.9	0.9	0.2	0.1	15.0	21.1	29	4.7	4.44	3.1	4.5	8.7	2.6	29.0	31.4	20.0	5.2
5-10	A3	1.0	0.3	0.1	<0.1	5.0	6.4	22	5.2	0.95	4.2	5.8	10.5	3.5	32.1	30.3	16.9	2.5
10-28	B21ir	--	--	--	--	--	--	--	5.4	0.37	4.4	4.8	8.3	2.8	31.4	30.8	18.3	4.0
28-50	B22ir	0.6	0.2	0.1	<0.1	2.1	3.0	30	5.3	0.12	4.3	3.1	6.4	3.2	36.2	30.7	15.5	3.7
50-65	B3	--	--	--	--	--	--	--	5.6	0.12	3.2	0.2	1.4	1.8	32.0	33.0	24.2	4.4
65-88	C1	--	--	--	--	--	--	--	5.8	0.07	1.8	0.0	0.0	2.2	21.8	48.5	23.0	2.7
88-100	C2	0.1	<0.1	<0.1	<0.1	1.0	1.1	9	6.2	0.07	1.2	0.0	0.0	0.3	16.5	42.5	35.1	4.4
100-123	C3	--	--	--	--	--	--	--	6.2	0.05	1.0	0.0	0.0	1.0	20.8	40.9	32.5	3.8

1 Acidity

2 CEC by sum of cations

3 International III - This is PSDA fine silt (.02-.002 mm).

Soil classification: Typic Udipsamment; mixed, frigid.

Soil: Omega.

Soil No.: S49WI-16-1.

Location: Douglas County, Wisconsin; SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 24, T. 45 N., R. 11 W.; 60 feet north of County Hwy. A, 6-1/2 miles west of Bayfield County line.

Climate: Continental; mean annual temperature ranges from 36° to 44° F; mean annual precipitation ranges from 26 to 30 inches; frost-free season is 90 to 105 days.

Vegetation and land use: Most of this soil is forested with jack pine and oak being the dominant species. A few areas have been cleared and are used for general farming or special crops such as potatoes.

Parent material: Sandy acid glacial outwash.

Physiography: Nearly level to hilly upland.

Topography: Nearly level plain with low ridges and swales. Gradient is 1 to 2 percent.

Drainage: Excessively drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Rapid.

Described by: J. K. Ableiter, I.J. Nyard, R.J. Muckenhirn, and V.J. Kilmer.

(Colors are for moist conditions unless otherwise noted)

A1 49982 0 to 5 cm (0 to 2 inches). Very dark brown (10YR 2/2) loamy sand, with many light gray (10YR 7/2) sand grains; weak fine granular structure; very friable; salt-and-pepper mixture of light and dark-colored sand grains are indicative of a mixture of A1 and A2 material; charcoal fragments up to 1/4 inch in diameter, bits of organic matter and wood present; many roots, along with fungi mycelia; very strongly acid.

A3 49983 5 to 10 cm (2 to 4 inches). Reddish brown (5YR 4/4) loamy sand, with grayish patches, light brown (7.5YR 6/4) dry; weak coarse granular structure; very friable; many roots, mostly fine; strongly acid.

B21ir 49984 10 to 28 cm (4 to 11 inches). Reddish brown (5YR 4/4) loamy sand, light reddish brown (5YR 6/4) dry; weak medium granular structure; very friable; common roots; strongly acid.

B22ir 49985 28 to 50 cm (11 to 20 inches). Yellowish red (5YR 4/6) sand, reddish brown to reddish yellow (5YR 5/4 to 6/6) dry; weak coarse granular structure; very friable; few roots; few basalt, sandstone, granite, and quartzite pebbles; strongly acid.

B3 49986 50 to 65 cm (20 to 26 inches). Yellowish red (5YR 5/6) sand, reddish yellow (5YR 6/6) dry; single grained; loose; few pebbles of quartzite, sandstone and basalt; medium acid.

C1 49987 65 to 88 cm (26 to 35 inches). Yellowish red (5YR 5/6) sand, light reddish brown (5YR 6/4) dry; weakly coherent to single grained; loose; few pebbles of basalt, sandstone, quartzite, granite, and other minerals; medium acid.

C2 49988 88 to 100 cm (35 to 40 inches). Brown (7.5YR 5/4) sand, light brown (7.5YR 6/4) dry; single grained; loose; numerous dark-colored grains; pebbles of basalt, quartz, and granite present; medium acid.

C3 49989 100 to 123 cm (40 to 49 inches). Brown to light brown (7.5YR 5/4 to 6/4) sand, light brown to pink (7.5YR 6/4 to 7/4) dry; single grained; loose; numerous dark-colored sand grains; few rounded pebbles of granite, quartzite, or basalt; medium acid.

SOIL Ontonagon SOIL Nos. S64WI-16-1 LOCATION Douglas County, Wisconsin

SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 19847-19854 June, 1968

GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)												3A1				Coarse fragments 3A2			
		Total				Sand				Silt				Int. I (2-0.1)	Int. II (0.074-0.002)	0.005- 0.002	Coarse fragments				
		Sand (2-0.05) %	Silt (0.05- 0.002)	Clay (\leq 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25) (0.25-0.1)	Fine (0.1-0.05)	Very fine (0.05-0.02)	Int. III (0.02- 0.002)	Int. I (2-0.1)	Int. II (0.074- 0.002)	Vol.				3B1 Wt.				
																		19-2	19-2		
																				Pct. of \leq 2 mm	
0-5	Ap	9.3	37.3	53.4	0.3	1.0	1.6	3.7	2.7	6.0	31.3	10.8	6.6	92.3	15.4						
5-9	B&A	5.0	18.2	76.8	0.2	0.5	0.8	2.0	1.5	3.0	15.2	5.7	3.5	95.9	8.3						
9-13	B2t	5.0	25.1	69.9	0.1	0.4	0.9	1.8	1.8	3.2	21.9	6.0	3.2		14.9						
13-19	B3	4.9	24.9	70.2	0.5	0.6	0.7	1.7	1.4	2.1	22.8	4.4	3.5	95.9	14.9						
19-26	C1ca	4.3	22.6	73.1	0.1	0.5	0.8	1.7	1.2	1.9	20.7	4.1	3.1	96.4	13.9						
26-39	C2ca	2.9	22.2	74.9	0.1	0.4	0.5	1.1	0.8	0.9	21.3	2.3	2.1	97.5	15.8						
39-54	C3	5.3	21.8	72.9	0.3	0.7	1.1	1.9	1.3	2.3	19.5	4.6	4.0	95.4	12.7						
54-65	C4	5.4	22.7	71.9	0.2	0.6	1.1	2.0	1.5	2.9	19.8	5.5	3.9	95.4							

Soil classification: Glossic Eutroboralfs; very-fine, mixed.

Soil: Ontonagon.

Soil No.: S64WI-16-1.

Location: Douglas County, Wisconsin; NW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 17, T. 48 N., R. 13 W.; 120 feet south of Highway Z by a pine tree in an abandoned field.

Climate: Humid continental; mean annual temperature is about 41° F; mean annual precipitation ranges from 26 to 30 inches; and frost-free season is about 109 days.

Vegetation and land use: Native vegetation was mixed spruce-pine forest. A small portion is being used for general farming. Some cutover areas are in second-growth aspen.

Parent material: Calcareous clay glacial lake deposits.

Physiography: Gently sloping to undulating glacial lake plains.

Topography: Site is on a 1 percent east-facing convex slope in an abandoned field.

Drainage: Moderate to well-drained.

Ground water: Deep

Erosion: Slight.

Permeability: Slow.

Described by: A.J.Klingelhoets, August 25, 1964.

(Colors are for moist soils unless otherwise stated)

Ap 19847 0 to 13 cm (0 to 5 inches). Dark reddish brown, dark reddish gray, and reddish brown (5YR 3/2, 4/2, and 4/4) silty clay; moderate fine and medium subangular blocky structure; firm; much earthworm activity and mixing; roots common; slightly acid; abrupt smooth boundary.

B6A 19848 13 to 23 cm (5 to 9 inches). Reddish brown (5YR 4/4) clay; medium columnar structure parting to moderate fine angular blocks; very firm, plastic, sticky; tongues of reddish gray (5YR 5/2) silty clay A2 with weak medium platy structure extend through this horizon and constitute about 20 percent of the horizon body; isolated peds of B2 are in the upper part; clay films are thin and patchy on peds of B2; roots common; slightly acid; clear irregular

boundary.

B2t 19849 23 to 33 cm (9 to 13 inches). Reddish brown (2.5YR 4/4) clay; moderate to strong very fine angular blocky structure; very firm, plastic, sticky; clay films thin but continuous; few hard lime concretions less than 3 mm in diameter; roots common; mildly alkaline; clear wavy boundary.

B3 19850 33 to 48 cm (13 to 19 inches). Reddish brown (2.5YR 4/4) clay; weak coarse prismatic structure parting to moderate to strong very fine angular blocks; very firm, plastic, sticky; clay films are thin but continuous; few hard lime concretions less than 3 mm in diameter; roots common; mildly alkaline; clear wavy boundary.

C1ca 19851 48 to 65 cm (19 to 26 inches). Reddish brown (2.5YR 4/4 and 5/4) clay; moderate coarse prismatic structure parting to moderate fine angular blocks; very firm, plastic, sticky; many light brownish and pinkish-gray (10YR and 7.5YR 6/2) soft lime segregations less than 5 mm in diameter; few hard lime concretions less than 3 mm in diameter; clay films are thick and continuous on pressure faces (slickensides); few roots; strong effervescence; gradual irregular boundary.

C2ca 19852 65 to 98 cm (26 to 39 inches). Reddish brown (2.5YR 4/4 and 5/4) clay; moderate coarse prismatic structure parting to moderate medium angular blocks; very firm, plastic, sticky; many light brownish and pinkish-gray (10YR and 7.5YR 6/2) soft lime segregations less than 5 mm in diameter; few hard lime concretions less than 3 mm in diameter; clay films are thick and continuous on pressure faces (slickensides); few roots; strong effervescence;

clear wavy boundary.

C3 19853 98 to 135 cm (39 to 54 inches). Reddish brown (2.5YR 4/4 and 5/4) clay; weak coarse prismatic structure parting to moderate medium angular blocks; very firm, plastic, sticky; very prominent slickensides with thick clay films; strong effervescence; gradual wavy boundary.

C4 19854 135 to 163 cm (54 to 65 inches). Reddish brown (2.5YR 4/4 and 5/4) clay; weak coarse prismatic structure parting to coarse angular blocks; very firm, plastic, sticky; very prominent slickensides with thick clay films; strong effervescence.

Remarks: Sand content in profile is estimated at less than 5 percent. Clay content was estimated to be greater than 60 percent in the B and C horizons.

Soil temperature:	Depth (inches)	Temperature
	20	14° C.
	30	14° C.
	40	14° C.

SOIL Ontonagon SOIL Nos. S64WI-16-3 LOCATION Douglas County, Wisconsin
 SOIL SURVEY LABORATORY Lincoln, Nebraska LAB. Nos. 19855-19862 June, 1968
 GENERAL METHODS: 1A, 1B1b, 2A1, 2B

Depth (in.)	Horizon	Size class and particle diameter (mm)													3A1			Coarse fragments 2A2			
		Total			Sand					Silt			Int. III (0.02- 0.002)	Int. II (0.2-0.02)	(2-0.1)	<0.074	0.005- 0.002	3B1			
		Sand (2-0.05) %	Silt (0.05- 0.002)	Clay (= 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02	Vol.	Wt.									
		Pct. of < 2 mm																	19-2	19-2	19-2
0-6	Ap	3.1	60.8	36.1	tr	0.4	0.5	0.9	1.3	14.9	45.9	16.7	1.8				14.9		-		
6-9	B&A	1.7	39.0	59.3	-	0.1	0.2	0.5	0.9	10.1	28.9	11.3	0.8				9.2		-		
9-16	B2t	0.7	31.6	67.7	tr	tr	0.1	0.2	0.4	4.0	27.6	4.5	0.3			99.0	11.9		-		
16-21	B3	0.8	41.1	58.1	-	0.1	0.1	0.4	0.2	2.3	38.8	2.8	0.6				17.1		-		
21-32	C1ca	1.1	27.8	71.1	0.2	0.2	0.2	0.3	0.2	0.4	27.4	0.8	0.9				17.9		tr		
32-39	C2ca	1.9	20.0	78.1	0.1	0.2	0.3	0.7	0.6	0.9	19.1	1.9	1.3				10.5		tr		
39-52	C3	3.2	17.9	78.9	0.2	0.3	0.6	1.3	0.8	2.4	15.5	3.9	2.4				8.3		tr		
52-65	C4	2.4	20.5	77.1	0.1	0.3	0.4	1.0	0.6	1.7	18.8	2.9	1.8				10.6		tr		
Depth (in.)	6A1a Organic carbon b Pct.	6B1a Nitrogen Pct.	C/N	Carbonate as CaCO ₃		3A1a Non- Carbon- ate Clay Pct.	Bulk density			4D1 COLE	Water content				3A1b Fine Clay <0.002 mm. Pct.	pH		8C1a (1:1)			
				6E1b <2mm Pct.	3A1a mm Pct.		4A1a Field- State g/cc	4A1d 1/3- Bar g/cc	4A1b Air- Dry g/cc		4B4 Field- State Pct.	4B1c 1/3- Bar Pct.	4B2 15- Bar Pct.	4C1 1/3-to 15-Bar in./in.							
				6E2a <0.002 mm Pct.																	
0-6	3.59	0.237	15			36	1.19	1.21	1.28	0.017	32.3	28.2	13.9	0.17	12.6			6.7			
6-9	0.62	0.071	9	-(s)		59	1.36	1.39	1.71	0.073	28.5	25.8	17.2	0.12				6.4			
9-16	0.39			tr(s)		68	1.41	1.38	1.70	0.073	27.6	27.4	19.2	0.12	18.0			7.5			
16-21	0.10					58	1.10	1.27	1.65	0.061	27.7	28.7	18.6	0.11				8.1			

Soil classification: Glossic Eutroboralfs; very-fine, mixed.

Soil: Ontonagon.

Soil No.: S64WI-16-3.

Location: Douglas County, Wisconsin, NW $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 25, T. 48 N., R. 14 W.; 400 feet east and 150 feet south of junction of county roads A and C.

Climate: Humid continental; mean annual temperature is about 41° F; mean annual precipitation ranges from 26 to 30 inches; and frost-free season is about 109 days.

Vegetation and land use: Native vegetation was mixed spruce-pine forest. A small part of this soil is being used for general livestock farming. Some cutover areas are in second growth aspen forests.

Parent material: Calcareous clay glacial lake deposits.

Physiography: Gently sloping to undulating glacial lake plain.

Topography: Site is on a 1 percent south-facing convex slope of gently undulating area.

Drainage: Moderately well to well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Slow.

Described by: A.J. Klingelhoets, August 25, 1964.

(Colors are for moist soils unless otherwise stated)

Ap 19855 0 to 15 cm (0 to 6 inches). Dark reddish gray, very dark gray, and dark reddish brown (5YR 4/2, 3/1, and 3/2) heavy silty clay loam; moderate fine subangular blocky structure; firm; some earthworm mixing; roots common; neutral; abrupt smooth boundary.

B&A 19856 15 to 23 cm (6 to 9 inches). Reddish brown (2.5YR 4/4) clay; weak medium columnar structure parting to moderate fine angular blocks; very firm, plastic, sticky; tongues of reddish gray (5YR 5/2) silty clay A2 with weak medium platy structure extend through this horizon and constitute about 20 percent of the horizon body; isolated peds of B2 are in the upper portion of this horizon; clay films are thin and patchy on peds of B2; roots common; slightly acid; clear wavy boundary.

B2t 19857 23 to 40 cm (9 to 16 inches). Reddish brown (2.5YR 4/4) clay; weak coarse prismatic structure parting to moderate to strong very fine angular blocks; very firm, plastic, sticky; clay films thin and continuous; few hard lime concretions less than 2 mm in diameter; roots common; mildly alkaline; clear wavy boundary.

SOIL CLASSIFICATION-TYPIC GLOSSOBORALF
COARSE-LOAMY, MIXED
SERIES - - - - -PADUS TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S72VI-21-8 COUNTY - - - FOREST

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 72L869-72L877

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO			
		SAND	SILT	CLAY	CLAY	VCOS	CORS	HEDS	FMES	VFMS	COSI	FMIS	VFIS	SAND	II	INTR	PINE	NON-	SD1
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	CLAY	TO	CLAY	BAR
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	PCT	PCT	CLAY
000-6	A1	21.6	63.9	14.5	6.9	.8	4.5	7.6	5.6	3.1	31.3	32.6		18.5	36.1	48			2.63
006-13	A2	38.1	55.7	6.2	1.5	1.6	7.7	14.5	9.6	4.7	27.1	28.6		33.4	34.5	24			.61
013-24	B21H1R	38.1	53.4	8.5	1.3	1.1	7.3	14.2	10.2	5.3	26.8	26.6		32.8	35.0	15			.79
024-36	B221R	48.1	46.5	5.4	1.0	2.2	9.4	18.4	12.6	5.5	25.2	21.3		42.6	34.3	19			.76
036-50	2A'2	49.0	46.6	4.4	.5	2.0	9.4	18.6	13.1	5.9	25.2	21.4		43.1	34.8	11			.75
050-72	2A6B'	54.9	37.6	7.5	1.3	1.4	8.9	21.2	16.7	6.7	22.1	15.5		48.2	33.7	17			.55
072-91	2B2T	66.0	26.8	7.2	1.9	1.9	11.7	26.3	19.8	6.3	15.8	11.0		59.7	27.6	26			.47
091-175	2C1	95.1	3.5	1.4	.5	8.1	24.2	35.3	25.1	2.4	2.7	.8		92.7	12.1				
175-220	2C2	98.8	.9	.3		1.8	19.5	52.3	24.5	.7	.8	.1		98.1	6.0				

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2 (BULK DENSITY)														WATER CONTENT				CARBONATE			
	VOL.	WT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	6E1B	3A1A	8C1A	8C1B	LT	LT	1/1	1/2
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-6	TR	0	TR	TR	TR	81	TR	.9	A					38.1							4.8	4.5
006-13	5	0	TR	5	1	62	6	1.0	A					3.8							4.6	4.0
013-24	5	0	TR	3	2	63	5	1.1	A					6.7							4.7	4.1
024-36	5	0	TR	5	3	52	8	1.2	A					4.1							4.8	4.2
036-50	5	0	TR	4	3	51	7	1.44	1.48	.009	23.8	20.8	3.3	.24	1.1B						4.8	4.3
050-72	5	0	TR	4	4	46	8	1.78	1.81	.005	13.9	11.8	4.1	.13	4.1B						4.9	4.3
072-91	5	0	5	3	2	35	5	1.87	1.93	.010	12.3	10.5	3.4	.13	4.1B						4.9	4.2
091-175	55	5	25	25	10	2	46	1.9	A					1.6							5.2	4.6
175-220	5	0	TR	2	2	1	4							.5							5.6	4.9

DEPTH		ORGANIC MATTER				IRON PHOS				(- EXTRACTABLE BASES 5B4A- -)				ACTY		AL		(CAT EXCB)		RATIO		RATIO		CA		(BASE SAT)	
		6A1A	6B1A	C/W	6C2B	6H2E		6Q2D	6P2B	6Q2B	6H1A		6Q1B	5A3A	5A6A	8D1	8D3	SP1	5C3	5C1							
ORG		NITG			EXT	TOTL				CA	NO	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC				
CARB					PP									EXTB	TRA	EXT	ACTV	TO	TO	NHAC	ACTY						

000-6	8.94		.6		26.4	3.4	.1	.9	30.8	38.0	.0	68.8	58.2	4.01	7.8	45	45	53
006-13	1.26		.7		2.4	.4	.1	.1	3.0	7.3	.8	10.3	8.7	1.40	6.0	28	29	34
013-24	1.70		1.5		1.4	.3	.1	.1	1.9	18.8	3.0	20.7	13.5	1.59	4.7	10	9	14
024-36	.54		.9		.7	.1	.1	TR	.9	12.0	2.3	12.9	8.7	1.61	7.0	8	7	10
036-50	.59		.7		.4	.1	TR	TR	.5	9.0	1.8	9.5	6.3	1.43	4.0	6	5	8
050-72	.20		.7		1.5	.5	TR	.1	2.1	6.6	2.4	8.7	7.0	.93	3.0	21	24	30
072-91	.11		.8		1.8	.8	TR	.1	2.7	4.7	1.3	7.4	6.1	.85	2.3	30	36	44
091-175																		
175-220																		

DEPTH	(SATURATED PASTE)				NA	NA	SALT	GYP	SATURATION EXTRACT 8A1-										ATTENBERG	
	8E1	8C1B	8A	5D2	5E	8D5	6P1A	8A1A	6H1B	6Q1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6H1A	4F1	4F2	
	REST	PH	H2O	ESP	SAR	TOTL		EC	CA	NO	NA	K	CO3	NO3	CL	S04	NO3	LQID	PLST	
	OHM-					SOLU	NH4NO3/													
CM	CH		PCT	PCT		PPH	PCT	CH	REQ / LITER										PCT	
000-6																				
006-13																				
013-24																				
024-36	34000	4.9	28.1					.21												
036-50																				
050-72																				
072-91																				
091-175	34000	5.2	21.0					.15												
175-220																				

IDENTIFICATION OF THE SPODIC HORIZON BY LABORATORY CRITERIA.

Soil classification: Typic Glossoboralf; coarse-loamy, mixed.

Soil: *Padus taxadjunct**

Soil No.: S72WI-21-8 (LSL Nos. 72L869-72L877).

Location: Forest County, Wisconsin; SW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 23, T. 38 N., R. 12 E.

Climate: Humid continental; mean annual temperature ranges from 40° to 45° F; mean annual precipitation ranges from 28 to 34 inches; frost-free season is 130 to 135 days.

Vegetation and land use: Native vegetation was mixed northern hardwoods and conifers. Cutover areas are presently in aspen. About 30 percent of this soil is cleared and used for general farming. Some wooded areas are pastured.

Parent material: Thin silt (probably loess) over sand and gravel outwash.

Physiography: Nearly level to steep glacial outwash plains, stream terraces, and pitted outwash.

Topography: Site is on a 2 percent plane slope in a wooded area.

Drainage: Moderate and well drained.

Ground water: Deep.

Erosion: Slight

Permeability: Moderate in sola, rapid in substratum.

Described by: Steve Payne and Robert Fox.

Sampled by: Robert H. Jordan and Robert L. Juve, September 21, 1972

(Colors are for moist soils unless otherwise stated)

O1 2 to 0 cm (1 to 0 inches). Partially decomposed leaves from the forest cover and about 1 cm of fully decomposed organic matter.

A1 72L869 0 to 6 cm (0 to 2 inches). Dark reddish brown (5YR 2/2) silt loam with a high sand content; weak fine granular structure; friable; about 5 percent fine gravel; many fine roots; high organic matter content; strongly acid; abrupt boundary.

A2 72L870 6 to 13 cm (2 to 5 inches). Brown (7.5YR 5/2) silt loam; weak fine subangular blocky structure parting to weak fine platy structure; friable; about 5 percent of fine gravel; roots common; very strongly acid; abrupt boundary.

B21hr 72L871 13 to 24 cm (5 to 9 inches). Brown (7.5YR 4/4) silt loam with high sand content; weak fine subangular blocky structure; very friable; fine roots common; very strongly acid; clear boundary.

B22t 72L872 24 to 36 cm (9 to 14 inches). Brown (7.5YR 5/4) sandy loam with high silt content; weak fine subangular blocky structure; very friable; roots common; very strongly acid; abrupt boundary.

IIA'2 72L873 36 to 50 cm (14 to 20 inches). Brown (7.5YR 4/2) sandy loam; moderate medium subangular blocky structure; slightly brittle, friable; vesicular; very strongly acid; clear boundary.

IIAB' 72L874 50 to 72 cm (20 to 29 inches). Brown (7.5YR 4/2) sandy loam, the crushed color is brown (7.5YR 4/4); weak medium subangular blocky structure; peds part to weak platy structure; some peds are brittle and weakly cemented; silt coatings on the peds and streaks of lighter color; clay films are common on the peds of the B horizon; strongly acid; abrupt boundary.

IIB2t 72L875 72 to 91 cm (29 to 36 inches). Reddish brown (5YR 4/3) heavy sandy loam; moderate medium subangular blocky structure; friable; clay films are common; about 5 percent medium and coarse gravel and about 5 percent fine gravel; a few coatings of silt and fine sand on the peds; many clay bridges; very strongly acid; abrupt wavy boundary.

IIC1 72L876 91 to 175 cm (36 to 70 inches). Strong brown (7.5YR 5/6) sand and gravel; single grained; loose; about 45 percent of medium and coarse gravel and 15 percent of fine gravel in the main body of the C1 horizon; just below the B2t horizon there is a layer about 15 cm thick of sand with about 10 percent gravel; there are also thin layers of brittle loam about 2 cm thick; about 5 percent of the horizon is cobbles; medium acid; abrupt wavy boundary.

IIC2 72L877 175 to 220 cm (70 to 88 inches). Brown (7.5YR 5/4) medium and coarse sand; single grained; loose; about 80 percent of the sand is medium; about 5 percent of the horizon is fine gravel.

Remarks: A sample of this soil, IIB2t horizon, was sent to the University of Wisconsin for examination of the thin section.

*This pedon lacks a spodic horizon; therefore, it is a taxadjunct to the *Padus* series.

SAMPLE NOS. 74L1489-74L1493

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

Soil classification: Terric Medisapriata; loamy, mixed, euic, mesic.

Series: Palms.

Padon: S74WI-55-3.

Location: Jefferson County, Wisconsin; SE $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 33, T. 8 N., R. 15 E.; 462 feet north from center of road (approx. opposite barn at farmstead) and 120 feet east from north-south drainage ditch.

SOIL CLASSIFICATION-AQUIC EUTROBORAL
FINE-LOAMY, MIXED
SERIES - - - - - RIETBROCK TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - 570WIS-37-5 COUNTY - - - MARATHON

GENERAL METHODS- - - 1A, 1B18, 2A1, 2B SAMPLE NOS. 70L902-70L911

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO		
CM		SAND 2- .05	SILT .05- .002	CLAY LT .002	FINE CLAY LT .0002	VCOS 2- 1	CORS 1- .5	MEDS .5- .25	FNES 10- .10	VFNS .05 .02	COSI .05 .02	FNSI .02 .002	VFSI .005- .002	FAML TEXT 2-1	INTR II .02	FINE CLAY TO CLAY	NON- CO3- CLAY	15- 15- BAR	801 TO CLAY
000-13	AP1	26.0	64.9	9.1	3.4	1.8	7.0	9.9	3.8	3.5	32.5	32.4		22.5	37.0	37			.67
013-22	AP2	23.9	66.0	10.1	3.8	1.6	6.1	9.0	3.6	3.6	33.8	32.2		20.3	38.4	38			.55
022-33	A2	32.1	56.2	11.7	4.9	2.0	7.5	12.2	5.5	4.9	33.0	23.2		27.2	39.5	42			.50
033-45	2B1A	27.2	47.8	25.0	14.7	2.8	5.5	7.4	5.1	6.4	26.6	21.2		20.8	34.8	59			.44
045-67	2B21T	24.1	45.6	30.3	18.1	3.7	4.4	3.5	4.9	7.6	24.4	21.2		16.5	34.4	60			.44
067-96	2B22T	34.9	39.4	25.7	15.2	4.5	7.0	6.2	9.8	7.4	19.6	19.8		27.5	31.7	59			.44
096-128	2B3T	42.0	37.3	20.7	11.7	5.3	8.7	8.4	11.8	7.8	18.2	19.1		34.2	31.7	57			.46
128-162	2C1	51.2	32.6	16.2	8.5	8.4	11.2	10.7	13.2	7.7	17.7	14.9		43.5	31.4	52			.48
162-192	2C2	61.4	18.9	19.7		17.7	15.5	10.2	11.6	6.4	7.3	11.6		55.0	19.0				.52
192-222	3C3	55.9	14.1	30.0		15.3	14.4	7.1	11.5	7.6	6.6	7.5		48.3	20.4				.44

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
CM	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	4A10	4A1H	4D1	4B1C	4B1C	4B2	4C1	4C1	4C1	6E13	3A1A	8C1A	8C1E	1/1	1/2
000-13	10	0	TR	10	5	65	16	1.35	1.41	.013	27.3	25.1	6.1	.23	2.88								6.0	5.6
013-22	10	0	TR	8	8	66	16	1.40A							5.6								6.2	5.7
022-33	20	0	TR	14	15	51	29	1.68	1.72	.006	20.4	17.3	5.9	.15	4.9B								6.1	5.5
033-45	15	0	20	5	TR	20	15	1.50A							10.9								5.8	5.2
045-67	55	0	35	23	10	27	50	1.47	1.76	.026	30.1	28.1	13.3	.10	3.68								5.4	4.8
067-96	40	0	22	23	11	31	43	1.55	1.90	.040	25.7	23.6	11.4	.11	1.9B								5.7	5.0
096-128	40	0	38	8	4	32	19	1.65	1.82	.020	22.3	20.4	9.6	.11	2.5B								5.7	5.2
128-162	45	0	39	9	7	24	26	1.73	1.85	.012	19.9	18.1	7.7	.10	1.9B								5.7	5.3
162-192	50	0	42	10	9	16	34						10.3										5.5	5.1
192-222	55	0	49	18	9	12	51	1.11	1.47	.040	34.9	34.1	13.2	.10									5.3	4.9

DEPTH	(ORGANIC MATTER)			IRON	PHOS	(--EXTRACTABLE BASES 5B4A--)					ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE	SAT)				
	6A1A	6B1A	C/N			6N2E	6O2D	6P2B	6Q2B	5A3A			5A6A	8D1						8D3	5F1	5C3	5C1
	ORGN	NITG	EXT			CA	MG	NA	K	BACL			KCL	NHAC						NHAC	SAT	EXTB	NHAC
	CARB	FE	TOTL			SUM	TEA	EXT	ACTY	CLAY			TO	MG						PCT	ACTY	PCT	
CM	PCT	PCT		PCT	(--					--MEQ	/ 100	G--						PCT	PCT				
000-13	1.77C	.140	13	1.1		7.8	1.3	0.1	0.2	9.4	8.0		17.4	10.5	1.15	6.0	74	54	90				
013-22	1.00	.077	13	1.1		7.3	1.2	0.2	0.1	8.8	4.3		13.1	9.7	0.96	6.1	75	67	91				
022-33	0.20	.027		1.4		6.2	2.0	0.2	0.2	8.6	4.0		12.6	9.4	0.80	3.1	66	68	91				
033-45	0.15	.023		1.7		10.6	6.1	0.2	0.3	17.2	6.4		23.6	18.2	0.73	1.7	58	73	95				
045-67	0.10	.017		2.1		10.7	8.0	0.2	0.4	19.3	6.1	0.4	25.4	20.1	0.66	1.3	53	76	96				
067-96	0.03			2.0		11.2	7.4	0.3	0.3	19.2	5.9		25.1	19.7	0.77	1.5	57	76	97				
096-128	0.03			1.9		9.1	6.7	0.2	0.2	16.2	4.3		20.5	17.4	0.84	1.4	52	79	93				
128-162	0.02			1.7		8.9	5.6	0.3	0.2	15.0	4.2		19.2	15.5	0.96	1.6	57	78	97				
162-192	0.03			3.4		8.7	5.5	0.3	0.3	14.8	6.4		21.2	16.8	0.85	1.6	52	70	88				
192-222	0.15			3.0		9.9	6.8	0.3	0.4	17.4	8.1		25.5	18.3	0.61	1.5	54	68	95				

DEPTH	(SATURATED PASTE)			NA		SALT		GYP		SATURATION EXTRACT		BA1		ATTERBERG	
CM	8E1	8C1B	8A	8D2	8E	8D5	8F1A	8A1A	8N1B	8D1B	8P1B	8Q1B	8I1A	8J1A	8K1A
000-13															32D
013-22															
022-33															
033-45															
045-67															
067-96															
096-128	2200	5.3	28.6	1	1	110		0.67	2.4	2.2	1.2	TR			31D
128-162															
162-192															
192-222															43D

- (A) ESTIMATED.
(B) MICRO-PENETRATION RESISTANCE - A ROD 3.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 1/10- BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.
(C) ORGANIC CARBON IS 5 KG/M SQ TO A DEPTH OF 1 M (6A1).
(D) DETERMINED BY SOIL MECHANICS LAB - SCS, LINCOLN, NE.

Soil classification: Aquic Eutroboralf; fine-loamy, mixed.

Soil: Rietbrock taxadjunct*.

Soil No.: S7OWI-37-5.

Location: Marathon County, Wisconsin; NE $\frac{1}{4}$, SE $\frac{1}{4}$, NE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 34, T. 30 N., R. 6 E.; in exact center of NE quarter.

Climate: Humid continental; mean annual temperature is about 43° F; mean annual precipitation is about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Native vegetation was mixed deciduous and coniferous forests. Many areas have been main-

ained for woodlands or used for pasture. Soil-samples have been cleared for general farming.

Parent material: Thin silty sediments over residuum from greenstone and fine-grained granite rocks.

Physiography: Nearly level to gently sloping rock-controlled uplands.

Topography: Site is on a 3 percent plane slope in a grass pasture.

Drainage: Somewhat poorly drained.

Ground water: Deep; a perched water table exists for short periods within 2 feet of the surface during wet seasons.

Erosion: Slight to none.

Permeability: Moderate

Described by: Paul H. Carroll

(Colors are for moist soils unless otherwise stated)

Apl 70L902 0 to 13 cm (0 to 5 inches). Dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; many fine fibrous roots; trace of greenstone and fine-grained granite rock fragments 2 to 75 mm in diameter; medium acid; abrupt smooth boundary.

Ap2 70L903 13 to 22 cm (5 to 9 inches). Dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; many fine prominent mottles of yellowish brown (10YR 5/6-5/8); weak fine subangular blocky structure; friable; many fine fibrous roots; trace of greenstone and fine-grained granite rock fragments 2 to 75 mm in diameter; medium acid; abrupt smooth boundary.

A2 70L904 22 to 33 cm (9 to 13 inches). Brown (10YR 5/3) silt loam with many fine prominent mottles of yellowish brown (10YR 5/6-5/8); weak thin platy structure; friable; common fine fibrous roots; trace of greenstone and fine-grained granite rock fragments 2 to 75 mm in diameter; medium acid; clear wavy boundary.

IIB&A 70L905 33 to 45 cm (13 to 18 inches). Dark yellowish brown (10YR 4/4) heavy loam (Bt) with many fine distinct and prominent mottles of yellowish brown (10YR 5/6-5/8), strong brown (7.5YR 5/6-5/8), and grayish brown (10YR 5/2); moderate medium subangular blocky structure; firm; occupies about 70 percent of the horizon and consists of upward extensions of the underlying B2t horizon; few fine fibrous roots; few thin clay films on faces of peds and in continuous pores; tongues of light brownish gray (10YR 6/2) very fine sandy loam (A2) surrounds the upward extensions of B2t; weak thin platy structure; friable; 15 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (20 percent 2 to 75 mm); medium acid; clear wavy boundary.

IIB21t 70L906 45 to 67 cm (18 to 26 inches). Dark brown (7.5YR 4/4) gravelly clay loam with many fine and medium distinct and prominent mottles of strong brown (7.5YR 5/8) and grayish brown (10YR 5/2); moderate fine and medium angular blocky structure; very firm; few fine fibrous roots; continuous clay films of dark brown (10YR 3/3) on faces of most peds and in tubular pores; thin patchy bleached silt coats along primary vertical cleavage planes; 20 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (25 percent 2 to 75 mm); medium acid; gradual wavy boundary.

IIB22t 70L907 67 to 96 cm (26 to 38 inches). Dark brown (7.5YR 4/4) gravelly clay loam with common fine distinct and prominent mottles of strong brown (7.5YR 5/6-5/8) and many fine black (10YR 2/1) manganese spots; moderate fine and medium angular blocky structure; very firm; many thin clay films on faces of peds and in tubular pores; 15 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (20 percent 2 to 75 mm); medium acid; gradual wavy boundary.

IIB3t 70L908 96 to 128 cm (38 to 50 inches). Dark brown (7.5YR 4/4) loam with common fine distinct and prominent mottles of strong brown (7.5YR 5/6-5/8) and common fine black (10YR 2/1) manganese spots; weak and moderate medium angular blocky structure; firm; many clay films on faces of peds and in tubular pores; 10 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (14 percent 2 to 75 mm); medium acid; gradual wavy boundary.

IIC1 70L909 128 to 162 cm (50 to 64 inches). Dark brown (7.5YR 4/4) sandy loam with common fine prominent black (10YR 2/1) manganese spots; weak fine angular blocky structure; firm; few thin clay films on faces of peds and continuous in tubular pores; 5 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (7 percent 2 to 75 mm); medium acid; gradual wavy boundary.

IIC2 70L910 162 to 192 cm (64 to 78 inches). Strong brown (7.5YR 4/4) sandy loam; weak fine and medium angular blocky structure; firm; common thin clay films on faces of peds and in tubular pores; 5 to 10 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (7 to 12 percent 2 to 75 mm); medium acid; gradual wavy boundary.

IIC3 70L911 192 to 222 cm (78 to 87 inches). Dark brown (7.5YR 4/2) gravelly sandy clay loam; weak medium and coarse angular blocky structure; firm; many thin locally derived clay films on faces of peds and in pores; clay films result from in place weathering (hydration) of biotite mica (aluminum silicate) books, giving rise to many isolated books of thin clay films; 10 percent by volume of greenstone and fine-grained granite rock fragments 20 to 75 mm in diameter (20 percent 2 to 75 mm); medium acid; gradual wavy boundary.

GENERAL METHODS- 1A, 1B1B, 2A1, 2B

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SAMPLE NOS. 760210-760217

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO			
		FINE				SAND				SILT				INTR		FINE		NON-801	
		SAND 2- - .05	SILT .05- - .002	CLAY LT - .002	CLAY LT - .0002	VCS 2- 1	CCRS 1- .5	MEOS 5- .25	FNES .25- .10	VFNS .10- .05	COSI .05 .02	FNSI .02 .002	VFSI .005- .002	SAND 2- .10	INTR 11 .02	FINE CLAY TO PCT	NON- CO3- CLAY PCT	801- 15- BAR TO CLAY	
CM	(- .05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	PCT	PCT	CLAY		
000-018	AP	53.7	41.9	4.4	1.2	5.9	18.5	16.6	7.8	4.9	24.3	17.6	48.8	31.2	27		.95		
018-036	A2	56.5	39.9	3.6	1.0	7.1	18.1	17.6	8.8	4.9	22.2	17.7	51.6	29.4	28		.58		
036-048	A6B	49.0	42.6	8.4	3.8	4.6	14.7	15.1	7.4	7.2	26.0	16.6	41.8	35.4	45		.48		
048-066	B5A	54.5	32.1	13.4	7.1	4.8	15.0	16.3	9.5	8.9	19.1	13.0	45.6	31.0	53		.43		
066-081	B2T	73.0	19.3	7.7	2.8	7.9	23.7	24.4	13.0	4.0	10.6	8.7	69.0	18.2	36		.47		
081-094	B83	76.5	17.1	6.4	2.8	10.3	22.4	26.3	14.4	3.1	9.2	7.9	73.4	16.0	44		.48		
C94-122	2C1	96.9	2.5	.6	.3	15.7	41.9	29.5	8.9	.9	1.0	1.5	96.0	4.3	50				
122-152	2C2	95.7	2.4	1.9	1.5	11.1	34.8	34.7	13.8	1.3	1.9	.5	94.4	6.8	79				

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 30, 301, 302)										(BULK DENSITY)				(- - - WATER CONTENT - - -)				CARBONATE (- - PH - -)			
	VCL. (- - - - - WEIGHT - - - - -)										4A10 4A1H 4D1 4B1C 4B1C 4B2 4C1				6E1B 3A1A 8C1A 8C1E							
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2					
	GT	75																				
CM	PCT	PCT	(- - - PCT LT 75	- - -)	LT20	G/C	G/C	G/C	BAR	BAR	BAR	CM/	PCT	PCT	PCT	PCT	PCT					
C00-C18	5	0	0	5	3	47	8	1.56	1.60	.008			18.2	4.2	.21		5.2	4.8				
C18-C36	5	0	TR	6	3	43	9	1.77	1.79	.004			10.8	2.1	.15		5.4	5.0				
C36-C48	5	0	TR	3	3	54	5	1.7 A						4.0			5.5	5.0				
C48-C66	5	0	TR	3	4	49	7	1.76	1.80	.007			10.9	5.8	.09		5.2	4.6				
C66-C81	5	0	TR	4	4	27	8	1.74	1.81	.013			11.2	3.6	.13		5.3	4.7				
C81-C94	15	0	TR	14	7	20	21	1.608			10.5C			3.1	.12		5.4	4.8				
C94-122	10	0	TR	7	7	3	14	1.598			2.1C			1.0	.02		5.5	4.8				
122-152	5	0	TR	6	6	4	12	1.6 A						1.1	.02		5.7	5.1				

DEPTH	ORGANIC MATTER			IRCN	PMS	EXTRACTABLE BASES 5B4A--				ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)		
	6A1A	6B1A	C/N			6C2B	6N2E	6O2D	6P2B			6K2B	6M1A				6G1E	5A3A	5A6A	801	803	5F1	5C3	5C1
	ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	TO	TC	SAT	EXTB	NHAC
CM	CARB			FE						EXTB	TEA	EXT	ACTY		CLAY		PCT	ACTY	PCT
	PCT	PCT		PCT						/ 100	G--								
000-018	1.16	.101	11			3.5	.6	.0	.1	4.2	5.9	TR	10.1	7.3	1.66	5.8	48	42	58
018-036	.20	.025	8			2.4	.5	.0	TR	2.9	3.1	.1	6.0	4.1	1.14	4.8	59	48	71
036-048	.16	.019	8			4.4	1.3	TR	.1	5.8	3.5	.1	9.3	7.4	.88	3.4	59	62	78
048-066	.18					5.6	2.0	TR	.2	7.8	5.0	.5	12.8	10.2	.76	2.8	55	61	76
066-081	.10					3.7	1.3	TR	.1	5.1	3.1	.3	8.2	6.4	.83	2.8	58	62	80
081-094	.10					3.3	1.1	TR	.1	4.5	2.8	.2	7.3	5.4	.84	3.0	61	62	83
094-122	.03					1.4	.5	TR	TR	1.9	1.3	TR	3.2	2.3	3.83	2.8	61	59	83
122-152	.00					1.4	.6	TR	TR	2.0	.9		2.9	2.1	1.11	2.3	67	65	95

[illegible]

CLAY MINERALOGY (7A2C)

36-48 MT3 KK2 VR1 M11 Q21

66-48	MT4	KK2	VR1	Q21
66-81	MT4	KK3	MI1	VR1

94-122 MV3 KK2 MI1 G21

RELATIVE AMOUNTS: (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.

Soil classification: Glossic Eutroboralf; coarse-loamy, mixed.

Soil: Rosholt taxadjunct*.

Soil No.: S75WI-95-6.

Location: Polk County, Wisconsin; SE $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 29, T. 34 N., R. 15 W.; 250 feet north of Highway No. 8 by field entrance. About 45°25' N. latitude and 92°15' W. longitude.

Climate: Humid continental; mean annual temperature is 43° F; mean July temperature is 71° F; mean January temperature is 11.8° F; mean annual precipitation is 27.5 inches with about two-thirds of this occurring during the growing season; mean annual snowfall is 41.2 inches; the growing season averages 127 days. (Data from Amery, WI., weather bureau substation.)

Vegetation and use: Native vegetation was mixed northern hardwood and conifer forests. Most large areas have been cleared and are being used for general farming. This site is presently in alfalfa hay.

Parent material: Loamy outwash 20 to 40 inches thick and stratified sand and gravel.

Physiography: Nearly level to sloping outwash plains, stream terraces and morainic areas in glaciated region.

Topography: Nearly level outwash plain; sample site is on a small rise with a 2 percent convex slope.

Drainage: Well drained.

Ground water: Deep; over 5 feet.

Erosion: Slight.

Permeability: Moderate in solum and rapid in substratum.

Described by: A. J. Klingelhoets and G. B. Lee, July 1975.

(Colors are for moist soil unless otherwise stated)

Ap 760210 0 to 18 cm (0 to 7 inches). Dark grayish brown (10YR 4/2) loam; moderate fine subangular blocky structure parting to moderate medium granular; friable; many roots; estimated 3 percent by volume of coarse fragments over 2 mm in diameter; slightly acid; abrupt smooth boundary.

A2 760211 18 to 36 cm (7 to 14 inches). Brown (10YR 5/3) light loam; moderate medium platy structure; friable; estimated 3 percent by volume coarse fragments over 2 mm in diameter; many roots; slightly acid; clear wavy boundary.

A&B 760212 36 to 48 cm (14 to 19 inches). Brown (10YR 5/3) light loam (A2); weak coarse platy structure; friable; occupies about 55 percent of horizon as tongues 10 to 30 mm thick extending into or completely surrounding isolated remnants of dark yellowish brown (10YR 4/4) loam (B2t); moderate medium subangular blocky structure; firm; a few thin patchy clay films on faces of peds (B2t); estimated 5 percent by volume coarse fragments greater than 2 mm in diameter; many roots; medium acid; gradual wavy boundary.

B&A 760213 48 to 66 cm (19 to 26 inches). Dark brown (7.5YR 4/4) heavy loam (B2t); moderate medium subangular blocky structure; firm; occupies about 70 percent of the horizon; thin patchy clay films on most faces of peds (B2t); tongues of brown (10YR 5/3) loam (A2) extend to bottom of horizon; weak coarse platy structure; friable; estimated 5 percent by volume coarse fragments greater than 2 mm in diameter; many roots; medium acid; clear wavy boundary.

B2t 760214 66 to 81 cm (26 to 32 inches). Dark brown (7.5YR 4/4) light loam; weak and moderate subangular blocky structure; friable; few thin patchy clay films mostly on vertical faces of peds; many roots; medium acid; clear wavy boundary.

IIB3 760215 81 to 94 cm (32 to 37 inches). Dark brown and dark yellowish brown (7.5YR 4/4 and 10YR 4/4) loamy coarse sand; weak medium subangular blocky structure; estimated 12 percent by volume coarse fragments greater than 2 mm in diameter; many roots; medium acid; clear wavy boundary.

IIC1 760216 94 to 122 cm (37 to 48 inches). Dark brown (7.5YR 4/4) coarse sand and fine gravel; single grained; loose; stratified; estimated 8 percent by volume coarse fragments greater than 2 mm in diameter; few roots; medium acid; abrupt smooth boundary.

IIC2 760217 122 to 152 cm (48 to 60 inches). Brown and strong brown (7.5YR 5/4 and 5/6) coarse sand and fine gravel; single grained; loose; stratified; estimated 8 percent by volume coarse fragments greater than 2 mm in diameter; slightly acid.

Additional notes:

1. Much of the Onamia with little or no silt influence may be close to the coarse-loamy family.
2. pH's in field determined by Truog kit.

*This pedon has higher base saturation in the argillic horizon than that allowed for the Rosholt series.

SOIL Sarona taxadjunct SOIL Nos. 86SWI-65-1 LOCATION Washburn County, Wisconsin
 SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 69B277 - 69B284

Depth (cm)	Horizon	Size class and particle diameter (mm) 3A1																
		1B1b Total				Sand					Silt			3B2 Cm	Coarse fragments 3B1			
		Sand (2-0.05)	Silt (0.05- 0.002)	Clay (= 0.002)	Very coarse (2-1)	Coarse (1-0.5)	Medium (0.5-0.25)	Fine (0.25-0.1)	Very fine (0.1-0.05)	0.05-0.02	Int. IY (0.02- 0.002)	Int. II (0.2-0.02)	(2-0.1)		<.074 mm Pct.	2A2 > 2 Pct.	2-19 Pct.	19-76 Pct. of < 76mm
Pct. of < 2 mm																		
5-0	O1	NOT SAMPLED	NOT SAMPLED															
0-3	A1	NOT SAMPLED	NOT SAMPLED															
3-21	A2	65.3	25.7	9.0	6.5	16.5	17.1	17.9	7.4	11.4	14.3	27.1	57.9	38.7		5	5	0
21-48	Bhir	67.3	26.5	6.2	4.6	13.4	18.4	20.8	10.1	12.7	13.8	33.1	57.2	38.0	0.85	23	14	9
48-69	Bir	67.1	24.0	8.9	4.5	12.5	18.0	21.5	10.7	12.3	11.7	33.9	56.4	39.0	0.84	24	18	6
69-81	A&B	83.4	12.9	3.7	8.4	22.3	24.7	21.1	7.0	6.8	6.1	23.1	76.4	20.3	0.85	22	13	9
81-112	B&A	69.3	26.2	4.5	8.2	18.0	20.9	12.3	10.0	18.8	7.4	29.5	59.3	36.2	0.83	23	17	6
112-137	B2t	75.5	18.1	6.4	4.9	15.1	21.0	23.7	10.8	10.3	7.8	32.8	64.7	30.3	0.87	18	16	2
137-160	B3t	78.6	15.6	5.8	6.1	15.4	22.5	24.7	9.9	8.6	7.0	30.5	68.7	26.5	0.82	24	17	7
160-175+	C	74.3	19.2	6.5	4.8	15.2	21.2	23.1	10.0	11.2	8.0	32.2	64.3	31.2	0.85	20	16	4
Depth (cm)	6A1a Organic carbon Pct.	Na Pyro. ext.		C-D Al	Carbonate as CaCO ₃ Pct.	Ext. iron as Fe Pct.	Bulk density			4D1 COLE	Water content			8E1 Resis- tivity ohms- cm 60°F	4C1 WRD in/in	pH		
		6C5a Fe Pct.	6G5a Al Pct.				Plasti- city Index	4A1e 1/2 bar g/cc	4A1h Oven dry g/cc		4B1c 1/2 bar Pct.	4B2 15 bar Pct.	8C1c (1:2) CaCl ₂			8C1e (1:1) KCl	8C1a (1:1) H ₂ O	
3-21	6.45			0.1		0.6												
21-48	0.75	0.2	0.2	0.1		0.7	N.P.	1.57	1.64	0.02		9.0	3.1		0.09	4.4	4.0	5.1
48-69	0.50	0.2	0.2	0.2		0.8		1.58	1.57	0.00		9.2	4.3		0.08	4.8	4.3	5.5
69-81	-	0.1	tr.	0.1		0.6		1.72	1.71	0.00		6.0	1.9		0.07	4.9	4.3	5.5
81-112	-			0.1		0.5		1.81	1.85	0.01		10.3	1.8		0.15	4.9	4.3	5.6
112-137	-			tr.		0.6		1.77	1.83	0.01		9.7	2.2	15000	0.13	5.0	4.2	5.7
137-160	-			tr.		0.6		1.80	1.85	0.01		9.9	2.4	15000	0.14	5.0	4.2	5.7
160-175+	0.12			tr.		0.8		1.85	1.88	0.00		9.2	2.7	15000	0.12	4.9	4.1	5.5
Depth (cm)	Extractable bases 5B4a				6H2a Ext. acidity meq/100 g	CEC		6G1e Ext. Al	Fine clay <.0002 mm Pct.	Ratios to clay 6D1			8D3 Ca/Mg	Base saturation				
	6N2e Ca	6O2d Mg	6P2b Na	6Q2b K		5A3e Sum cations	5A6a NH ₄ OAc			CEC Sum	Ext. iron	15-bar water		5C3 Sum cations Pct.	5C1 NH ₄ OAc Pct.			
3-21	7.3	0.9	tr.	tr.	8.2	13.9	22.1	15.8		2.9	2.46	0.07		37	52			
21-48	0.9	0.2	tr.	tr.	1.1	8.8	9.9	5.3		1.8	1.60	0.11	0.50	11	21			
48-69	1.3	0.4	tr.	tr.	1.7	10.5	12.2	6.1		1.6	1.37	0.09	0.48	14	28			
69-81	1.2	0.2	tr.	tr.	1.4	3.8	5.2	2.6		0.8	1.40	0.16	0.51	27	54			
81-112	1.4	0.3	tr.	tr.	1.7	3.0	4.7	2.6		0.7	1.04	0.11	0.40	36	65			
112-137	2.0	0.6	tr.	tr.	2.6	1.9	4.5	3.4		1.3	0.70	0.09	0.34	58	76			
137-160	2.0	0.6	tr.	tr.	2.6	2.6	5.2	3.7		1.9	0.90	0.10	0.41	50	70			
160-175+	2.5	0.6	tr.	tr.	3.1	3.0	6.1	4.3		2.1	0.94	0.12	0.42	51	72			
Depth (cm)	Clay fraction analysis 7A1					Sand fraction analysis 7A1					TW							
	<0.002 mm					0.2-0.02 mm												
	7A2 X-ray a/b/ Pct.					7B1 Petrographic b/ Pct.												
3-21	VR5, KK3, CL1, MI1, QZ1, FD1					KK20 QZ72, FE2, SP* 1, FD20, MS2, HN1, EP1, TA1, AU* 1, GN* 1					25							
21-48																		
48-69																		
69-81	VR3, KK3, CL2, MI2, QZ1, FD1					KK20 QZ81, FE2, ZR* 1, FD14, HN1, EP1, MS* 1, GN* 1, TA* 1, VR* 1					16							
81-112																		
112-137																		
137-160																		
160-175+	VR3, KK3, MI2, MT1, QZ1, FD1					KK20 QZ78, FE6, SP1, ZR* 1, FD10, EP3, HN1, MS* 1, AU* 1, GN* 1, VR* 1, TA* 1					14							

a/Relative amounts (X-ray): 5 = dominant, 4 = abundant, 3 = moderate, 2 = small, 1 = trace.

b/Mineral code: VR = vermiculite, KK = kaolinite, CL = chlorite, MI = mica, QZ = quartz, FE = iron oxides,
 SP = sphene, FD = feldspar, MS = muscovite, HN = hornblende, EP = epidote, TA = talc, AU = augite,
 GN = garnet, ZR = zircon, MT = montmorillonite.

Soil classification: Typic Dystrachrept; coarse-loamy, mixed frigid.

Soil: Sarona taxadjunct*.

Soil No.: 869WI-65-1.

Location: Washburn County, Wisconsin; SE $\frac{1}{4}$, NE $\frac{1}{4}$, NE $\frac{1}{4}$, Sec. 9, T. 37 N., R. 10 W.; 200 yards southwest of junction of road with the lake.

Climate: Humid continental; mean annual temperature is about 45° F; mean annual precipitation is about 30 inches and average frost-free season is 135 days.

Vegetation and land use: Native vegetation was mixed northern hardwood forest. About 50 percent of this soil is used for livestock pasture and crop production. Principal crops are corn, small grains, and forages.

Parent material: Acid loamy sand glacial till.

Physiography: Sloping to hilly glacial ground and end moraines.

Topography: Site is on a convex 5 percent slope near the top of a hill.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: Paul H. Carroll

(Colors are for moist soil unless otherwise stated)

O1 (not sampled) 5 to 0 cm (2 to 0 inches). Very dark brown (10YR 2/2) and very dark grayish brown (10YR 3/2) leaf mat; strongly acid; abrupt smooth boundary.

A1 (not sampled) 0 to 3 cm (0 to 1 inch). Very dark brown (10YR 2/2) loam or sandy loam with many white sand grains that impart a salt-and-pepper appearance to the horizon; weak fine granular structure; very friable; common roots; strongly acid; abrupt smooth boundary.

A2 69B277 3 to 21 cm (1 to 8 inches). Brown (7.5YR 4/2) and dark reddish gray (5YR 4/2) loam or sandy loam; weak fine subangular blocky structure; very friable; common roots; strongly acid; gradual wavy boundary.

Bhr 69B278 21 to 48 cm (8 to 19 inches). Dark brown (7.5YR 4/4) and reddish brown (5YR 4/4) loam or sandy loam; weak fine subangular blocky structure; very friable; common roots; strongly acid; gradual wavy boundary.

Bir 69B279 48 to 69 cm (19 to 27 inches). Dark brown (7.5YR 4/4) sandy loam; weak fine and medium subangular blocky structure; friable; common roots; strongly acid; clear wavy boundary.

A&B 69B280 69 to 81 cm (27 to 32 inches). Dark reddish gray (5YR 4/2) loamy sand and reddish brown (5YR 4/3) light sandy loam; A2 material occupies 60 to 80 percent of the horizon and surrounds isolated remnants or upward extensions of sandy loam B2t horizon; weak thin platy structure in the A2 material and weak medium subangular blocky structure in the B2t material; very friable and friable, with the B2t material being slightly fragile; slightly higher clay content in the B2t than in the A2 portions of the horizon; contains 8 to 10 percent mostly gravel with some cobblestones; common roots; strongly acid; clear wavy boundary.

B&A 69B281 81 to 112 cm (32 to 44 inches). Dark reddish brown (5YR 3/4) sandy loam upward extensions of the B2t horizon occupy approximately 60 to 70 percent of the horizon, with tongues of the dark reddish gray (5YR 4/2) and reddish brown (5YR 4/3) loamy sand A2 material penetrating the B2t from the horizon above; weak fine and medium subangular blocky structure in the B2t portion of the horizon and very weak thin platy structure in the A2 portion; firm and friable; occasional clay films on faces of peds in the B2t portion; contains 8 to 10 percent by volume of gravel and cobblestones; few roots; medium acid; clear irregular boundary.

B2t 69B282 112 to 137 cm (44 to 54 inches). Dark reddish brown (5YR 3/4) sandy loam; weak and moderate medium subangular blocky structure with weakly expressed coarse platiness; firm; clay films are thin and patchy on faces of peds; occasional tongues of A2 material penetrate this horizon; few roots; slightly acid; clear wavy boundary.

B3t 69B283 137 to 160 cm (54 to 63 inches). Dark reddish brown (5YR 3/4) and reddish brown (5YR 4/4) loamy sand; weak coarse subangular blocky structure with weakly expressed coarse platiness; friable; to firm; few thin clay films on faces of peds; slightly acid; gradual wavy boundary.

C 69B284 160 to 175 cm (63 to 69 inches). Reddish brown (5YR 4/4) loamy sand or sandy loam; weak thick platy structure to massive; friable; slightly acid.

*This pedon lacks both spodic and argillic horizons; therefore it is a taxadjunct to the Sarona series.

SOIL Sarona taxadjunct SOIL Nos. S69WI-65-2 LOCATION Washburn County, Wisconsin
SOIL SURVEY LABORATORY Beltsville, Maryland LAB. Nos. 69B285 - 69B292

Depth	Horizon	1B1b Size class and particle diameter (mm) 3A1													<.074 mm	3B2	Coarse fragments 3B1				
		Total			Sand					Silt			Int. III	Int. II			2A2				
		Sand (2-0.075)	Silt (0.075-0.005)	Clay (0.005-0.002)	Very coarse (2-0.85)	Coarse (0.85-0.425)	Medium (0.425-0.25)	Fine (0.25-0.15)	Very fine (0.15-0.075)								> 2	2 - 19	19 - 76		

Soil classification: Typic Dystrachrept; coarse-loamy, mixed, frigid.

Soil: Sarona taxadjunct*.

Soil No.: 869WI-65-2.

Location: Washburn County, Wisconsin; NE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 32, T. 38 N., R. 10 W.; 150 yards south and 50 yards west of right-angle turn in road.

Climate: Humid continental; mean annual temperature is about 45° F; mean annual precipitation is about 30 inches; and average frost-free season is 135 days.

Vegetation and land use: Native vegetation was mixed hardwood forest. About 50 percent of this soil is cultivated or used for livestock pasture. Principal crops are corn, small grain, and forage.

Parent material: Acid loamy sand glacial till.

Physiography: Sloping to hilly glacial ground and end moraines.

Topography: Site is on a 6 percent convex slope near the top of a hill.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: Paul H. Carroll.

(Colors are for moist soils unless otherwise stated)

O1 (Not sampled) 5 to 0 cm (2 to 0 inch). Very dark brown (10YR 2/2) mat of partially decayed leaves.

A21 (Not sampled) 0 to 5 cm (0 to 2 inches). Brown (7.5YR 4/2) loamy sand; very weak granular structure that becomes single grained at the upper boundary; very friable, becoming loose at the upper boundary; strongly acid; abrupt smooth boundary.

A22 69B285 5 to 13 cm (2 to 5 inches). Brown (7.5YR 4/2) and 5/3) sandy loam; weak fine subangular blocky structure; very friable; common roots; strongly acid; clear smooth boundary.

Bhr 69B286 13 to 41 cm (5 to 16 inches). Reddish brown (5YR 4/4) and dark brown (7.5YR 4/4) sandy loam; weak fine subangular blocky structure; very friable; common roots; medium acid; clear wavy boundary.

Bir 69B287 41 to 64 cm (16 to 25 inches). Dark brown (7.5YR 4/4) sandy loam; weak fine subangular blocky structure; friable; common roots; medium acid; clear wavy boundary.

A&B 69B288 64 to 87 cm (25 to 34 inches). Dark brown (7.5YR 4/4) and brown (7.5YR 5/4) eluviated loamy (A2 material) occupies 60 to 75 percent of this horizon and surrounds isolated remnants or upward extensions of reddish brown (5YR 4/4) and dark reddish brown (5YR 3/4) sandy loam argillic horizons; weak thin platy structure in the A2 material and weak medium subangular blocky structure in the B2t material; very friable and friable with the B2t material being slightly fragile; contains 10 to 12 percent by volume of gravel and cobblestones; few roots; medium acid; clear wavy boundary.

B&A 69B289 87 to 127 cm (34 to 50 inches). Reddish brown (5YR 4/4) and dark reddish brown (5YR 3/4) sandy loam upward extensions of B2t material occupy approximately 60 to 70 percent of the horizon body, with tongues of brown (7.5YR 4/4) loamy sand A2 material penetrating the B2t from the horizon above; weak and moderate medium subangular blocky structure in the B2t material and weak medium platy structure in the A2 material; friable and firm; occasional clay films on faces of peds in the B2t material; contains 10 to 12 percent by volume of gravel and cobblestones; few roots; medium acid; clear irregular boundary.

B2t 69B290 127 to 152 cm (50 to 60 inches). Dark reddish brown (5YR 3/4) sandy loam; weak and moderate medium and coarse subangular blocky structure with weakly-expressed coarse platiness; firm; thin continuous clay films on many faces of peds, patchy on others; few tongues of dark brown (7.5YR 4/4) light sandy loam penetrate this horizon and occupy 2 to 7 percent of the horizon body; contains 10 to 12 percent by volume of gravel and cobblestones; medium acid; gradual wavy boundary.

B3t 69B291 152 to 182 cm (60 to 72 inches). Reddish brown (5YR 4/4) and dark reddish brown (5YR 3/4) loamy sand; weak coarse subangular blocky structure to nearly massive with weakly-expressed coarse platiness throughout; friable; few clay films on faces of peds and clay bridging of sand grains; contains 10 to 12 percent by volume of cobblestones and gravel; medium acid.

C 69B292 182 to 203 cm (72 to 80 inches). Reddish brown (5YR 4/4) loamy sand; weak coarse subangular blocky structure to massive with weakly-expressed coarse platiness throughout; friable; contains 10 to 12 percent by volume of gravel and cobblestones; medium acid.

*This pedon lacks both spodic and argillic horizons; therefore, it is a taxadjunct to the Sarona series.

SERIES - - - - - SEELYEVILLE

SOIL NC - - - - - \$74WI-83-3

SOIL NC - - - - - \$74WI-83-3 COUNTY - - - OCCENTO

GENERAL METHODS- - -1A, 1B 1B, 2A 1, 2B

SAMPLE NOS. 74L878-74L883

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO		
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND		II	CLAY	COS
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY	BAR
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	TO	CLAY
CM		PCT LT 2MM														PCT	PCT	CLAY
000-015	CA1																	
015-038	CA2																	
038-082	CA3																	
082-096	CA4																	
096-147	CA5																	
147-167	2C	97.6	1.5	.9		.1	10.3	46.0	37.4	3.8	1.5	TR		93.8				

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 38, 381, 382)										BULK DENSITY				(- - - WATER CONTENT - - -)				CARBONATE (- - PH - -)			
	VOL. (- - - WEIGHT - - -)					4A1D 4A1M 4D1 4B1C 4B1C 4B2A 4C1					6E1B 3A1A 8C1A 8C1E											
GT	75-20	20-5	5-2	LT	20-2	1/3-1	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2						
G	75						BAR	DRY	BAR	BAR	BAR	CM/	2	.002	H2O	CACL						
CM	PCT	PCT	(- - - PCT	LT 75	- - -)	LT20	G/CC	G/CC	PCT	PCT	PCT	CM	PCT	PCT								
000-015	TR	0	0	0	TR							50.0				5.2	4.6					
C15-038	TR	C	0	0	TR		.47	.74	151	145	57.3	.44				5.1	4.6					
038-082	0	0	0	0	C		.24	.62	336	328	85.3	.60				4.4	4.0					
C82-C96	0	C	0	0	C		.23	.71	384	372	93.7	.67				4.4	4.0					
096-147	0	0	0	0	0		.17	.56	553	514	101	.77				4.6	4.2					
147-167	TR	C	0	C	TR							1.4				4.8	4.2					

[illegible][illegible][illegible]

Soil classification: Typic Borosaprists; euic.

Series: Seelyeville.

Pedon No.: S74WI-83-3.

Location: Oconto County, Wisconsin; SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 4, T. 30 N., R. 18 E.; 600 feet east (opposite machine shed) of farm lane. About 45.1° north latitude and about 88.2° west longitude.

Climate: Humid continental. Mean annual temperature is 43.4° F; mean July temperature is 69.6° F; mean January temperature is 15.6° F; mean annual precipitation is 27.94 inches with nearly two-thirds of the precipitation falling during the growing season; total amount of snowfall is 47.9 inches; the growing season averages 119 days, but less in the organic areas (data from Crivitz High Falls, WI, weather bureau substation).

Parent material: Deposits of herbaceous organic material more than 51 inches thick.

Physiography: Large glacial lake basin with many scattered sand "islands."

Vegetation: Area sampled was in potatoes and Cris variety of spring wheat.

Size of area: About 4,000 to 5,000 acres.

Distance to adjacent mineral soil: About 200 feet to nearest sand "island."

Depth to water table: 152 cm.

Microrelief: None

Subsidence: Estimated as moderate.

Soil temperature: Measured soil temperature of 15.2° C at 50 cm.

Described and sampled by: G.W. Hudelson, W.C. Lynn, W.E. McKinzie, G.B. Lee, and A.J. Klingelhoets on August 6, 1974. Samples were obtained from pit.

Oap 74L878 0 to 15 cm. Black (10YR 2/1) broken face, rubbed, or pressed sapric material; about 5-10 percent fiber, less than 5 percent rubbed; weak fine granular structure; very friable; fibers primarily herbaceous; about 20 percent mineral soil material; common roots; pH 5.5 (Truog); abrupt smooth boundary.

Oa2 74L879 15 to 38 cm. Black (10YR 2/0), black (10YR 2/1) rubbed or pressed sapric material; about 5-10 percent fiber, less than 5 percent rubbed; weak medium subangular blocky structure parting to weak fine subangular blocky structure; friable; fibers primarily herbaceous; about 25 percent mineral soil material; common roots; pH 5.5 (Truog); abrupt smooth boundary.

Oa3 74L880 38 to 82 cm. Black (10YR 2/0), black (10YR 2/1) rubbed or pressed sapric material; about 5-10 percent fibers, less than 5 percent rubbed; weak coarse prismatic structure parting to moderate coarse subangular blocky structure; friable; fibers primarily herbaceous; about 2.5 percent mineral soil material; common roots; pH 5.5 (Truog); abrupt wavy boundary.

Oa4 74L881 82 to 96 cm. Very dark brown (10YR 2/2), black (10YR 2/1) rubbed, very dark brown (10YR 2/2) pressed sapric material; about 25 percent fiber, 5-10 percent rubbed; weak coarse platy structure with matted areas; very friable; fibers primarily herbaceous, about 20 percent mineral soil material; few roots; pH 5.5 (Truog); clear wavy boundary.

Oa5 74L882 96 to 147 cm. Very dark grayish brown (10YR 3/2), black (10YR 2/1) rubbed, very dark grayish brown (10YR 3/2) pressed hemic material; about 60 percent fiber, 5 to 10 percent rubbed; massive; very friable; fibers primarily herbaceous; about 20 percent mineral soil material; pH 5.8 (Truog); abrupt smooth boundary.

IIC 74L883 147 to 167 cm. Grayish brown (10YR 4/2) sand; few fine faint brown (10YR 5/3) mottles; single grained; loose; pH 7.0 (Truog).

Remarks:

1. In Oa3, iron segregations along old root channels are dark reddish brown (5YR 3/4 and 3/3).
2. In Oa4, spots and streaks of soft iron (limonite) segregations, 1/2 to 3 cm in diameter, are dark reddish brown (2.5YR 3/4), dark red (2.5YR 3/6), dark reddish brown (5YR 3/3), and strong brown (7.5YR 5/6).
3. In C horizon, 3/4 inch mixed sedge and limnic material at contact of sand.

SOIL CLASSIFICATION - MOLLIC HAPLOQUEPT, FINE-SILTY
OVER CLAYEY, MIXED, FRIGID
SERIES - - - - - SHERRY VARIANT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S70W15-71-1 COUNTY - - - WOOD

GENERAL METHODS - - - 1A, 1B1B, 2A1, 2B

SAMPLE NOS. 70L912-70L923

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B														RATIO				
		SAND				SILT				CLAY				INTR		FINE		NON-		8D1
		2- 0.05	0.05- 0.002	CLAY LT 0.002	FINE CLAY 0.0002	VCOS 2- 1	CORS 1- 0.5	MEDS 0.5- 0.25	FNES 0.25- 0.10	VFNS 0.10- 0.05	COSI 0.05- 0.02	FNSI 0.02- 0.002	VFSI 0.002- 0.0002	FAML TEXT SAND	TEXT 2- 0.02	CLAY TO CLAY	CO3- TO CLAY			
CM	PCT LT 2MM														PCT		PCT		PCT	
000-7	A11	7.0	68.3	24.7	.5	1.4	1.5	1.6	2.0	19.5	44.7		5.0	22.2				.98		
007-16	A12	5.8	74.0	20.2	.2	.9	1.3	1.5	1.9	20.9	27.2		3.9	23.5				1.14		
016-34	B21G	4.8	70.8	24.4	.0	.5	.8	.6	2.9	30.9	39.9		1.9	34.1				.45		
034-53	B22G	6.7	73.7	19.6	.1	.8	1.4	1.0	3.4	37.7	36.0		3.3	41.5				.48		
053-80	B23G	7.9	73.7	18.4	.2	1.1	2.0	1.5	3.1	40.1	33.6		4.8	43.8				.47		
080-96	B24	87.3	8.0	4.7	.8	18.0	39.6	25.6	3.3	5.2	2.8		84.0	14.7				.34		
096-124	B25(TB)	34.9	22.6	42.5	2.4	6.7	7.4	11.0	7.4	6.5	16.1		27.5	19.6				.32		
124-160	B26(TB)	30.4	21.5	48.1	2.0	6.6	6.0	9.3	6.5	6.1	15.4		23.9	17.5				.31		
160-180	B3(TB)	40.4	27.9	31.7	4.7	10.6	5.9	10.3	8.9	7.9	20.0		31.5	22.7				.43		
180-200	B3C1	44.4	34.7	20.9	.9	2.6	3.3	13.7	21.9	14.0	20.7		22.5	46.8				.81		
200-240	B3C2	34.0	36.4	29.6	2.3	4.3	3.7	10.6	13.1	11.3	25.1		20.9	31.3				.61		
240-295	B3C3	51.6	29.7	18.7	4.3	6.6	5.3	16.9	18.5	11.7	18.0		33.1	41.5				.65		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2)										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	VOL. (- - - - -)										4A1D 4A1H 4D1 4B1C 4B1C 4B2 4C1				6E1B 3A1A 8C1A 8C1E									
	WEIGHT										1/10 1/3- 1/3													

DEPTH (ORGANIC MATTER)			IRON	PHOS	(- -EXTRACTABLE BASES 5B4A- -)					ACTY	AL	(CAT EXCH)	RATIO	RATIO	CA	(BASE SAT)			
6A1A	6B1A	C/N	6C2B	6N2E	6O2D	6P2B	6Q2B	6R2B	6S2B	6T2B	6U2B	6V2B	6W2B	6X2B	6Y2B	6Z2B			
ORGN	NITG		EXT	TOTL	CA	MG	NA	K	SUM	EXTB	TEA	G-	EXT	ACTY	NHAC	CA			
CARB			FE												TO				
PCT	PCT		PCT	PCT	(- -	- -	- -	- -	-MEQ	/ 100					CLAY	MG			
CM																			
000-7	1.00C	.766	14	0.5	27.3	10.3	0.3	0.4	38.3	31.6			69.9	48.9	1.98	2.7	56	55	78
007-16	9.59	.676	14	0.6	19.1	11.3	0.3	0.3	31.0	34.7			65.7	45.4	2.25	1.7	42	47	68
016-34	0.87	.066	13	0.2	9.3	9.6	0.2	0.4	19.5	5.3			24.8	19.9	0.82	1.0	47	79	98
034-53	0.32	.022		0.5	8.5	9.5	0.2	0.4	18.6	2.1			20.7	15.8	0.81	0.9	54	90	118
053-80	0.23			0.5	8.3	8.9	0.2	0.5	17.9	1.8			19.7	14.0	0.76	0.9	59	91	128
080-96	0.03			0.4	1.5	1.7	0.1	0.1	3.4	0.6			4.0	3.1	0.66	0.9	48	85	110
096-124	0.03			6.0	2.7	3.3	TR	0.2	6.2	3.0			9.2	6.1	0.14	0.8	44	67	102
124-160	0.03			6.0	2.5	3.3	TR	0.2	6.0	4.1			10.1	6.2	0.13	0.8	50	79	97
160-180	0.03			4.7	3.7	4.7	TR	0.4	8.8	2.9			11.7	9.7	0.31	0.8	38	75	91
180-200	0.03			6.5	6.3	7.9	0.1	0.7	15.0	3.7			18.7	16.4	0.78	0.8	38	80	91
200-240	0.07			5.6	7.5	9.0	0.1	0.8	17.4	2.4			19.8	17.2	0.58	0.8	44	88	101
240-295	0.02			6.1	4.2	3.5	0.1	0.5	8.3	1.3			9.6	9.6	0.51	1.2	44	86	86

DEPTH	SATURATED PASTE				NA				SALT				SATURATION				EXTRACT				ATTERBERG			
CM	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6D1B	6P1B	6O1B	6A1B	6J1A	6K1A	6L1A	6M1A	6N1A	6O1A	6P1A	4F1	4F2	LOID	PLST
	REST	PH	H2O	ESP	SAR	TOTL	SOLU	PPM	PCT	PCT	PCT	PCT	NA	K	CO3	HCO3	CL	SO4	NO3					
	CM		PCT	PCT																				
000-7																								
007-16																								
016-34																								
034-53	1600	7.0	40.3	1		200		0.71	3.0	4.2	0.5	TR												
053-80																								
080-96																								
096-124	4000	5.9	37.0			40		0.21	0.7	1.0	0.1	TR												
124-160																								
160-180																								
180-200																								
200-240																								
240-295																								

(A) ESTIMATED.

(B) MICRO-PENETRATION RESISTANCE - A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 1/10- BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.

(C) ORGANIC CARBON IS 19 KG/M SQ TO A DEPTH OF 1 M (6A).

Soil classification: Mollic Haplaquept; fine-silty over clayey, mixed, frigid.

Soil: Sherry variant;

Soil No.: S70WI-71-1.

Location: Wood County, Wisconsin; NW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 12, T. 23 N., R. 6 E.

Climate: Humid continental; mean annual temperature about 43° F; mean annual precipitation about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Original vegetation was sedges and water tolerant trees. Much of this soil is in pasture and woodland. Small areas are cleared for general farming.

Parent material: Silty sediments over clayey residuum from micaceous schists.

Physiography: Rock-controlled lowlands.

Topography: Nearly level site with 1 percent slope.

Drainage: Poorly drained.

Ground water: 2 meters.

Erosion: None

Permeability: Moderate to 80 cm; slow or very slow to 160 cm.

Described by: Paul H. Carroll

(Colors are for moist conditions unless otherwise stated)

A11 70L912 0 to 7 cm (0 to 3 inches). Black (10YR 2/1) silt loam; weak fine subangular blocky structure; friable; many fine fibrous roots; slightly acid; abrupt smooth boundary.

A12 70L913 7 to 16 cm (3 to 6 inches). Black (10YR 2/1) silt loam; moderate fine and medium subangular blocky

B21g 70L914 16 to 34 cm (6 to 13 inches). Olive gray (5Y 5/2) silt loam with common fine prominent mottles of strong brown (7.5YR 5/6-5/8) and yellowish red (5YR 5/6-5/8) mostly along root channels; weak medium angular and subangular blocky structure displaying very weak thin platy structure; firm; neutral; gradual wavy boundary.

B22g 70L915 34 to 53 cm (13 to 21 inches). Olive gray (5Y 5/2) silt loam with many fine prominent mottles of strong brown (7.5YR 5/6-5/8) and yellowish red (5YR 5/6-5/8) mostly along root channels; weak medium angular and subangular blocky structure displaying very weak thin platy structure; friable; neutral; gradual wavy boundary.

B23g 70L916 53 to 80 cm (21 to 31 inches). Olive gray (5Y 5/2) silt loam with common fine prominent mottles of strong brown (7.5YR 4/6-4/8) and yellowish red (5YR 4/6-4/8) mostly along old root channels; weak medium subangular blocky structure; friable; neutral; abrupt wavy boundary.

IIB24 70L917 80 to 96 cm (31 to 38 inches). Reddish brown (5YR 5/4-4/4) medium sand; single grained; loose; slightly acid; abrupt wavy boundary.

IIB25(tb) 70L918 96 to 124 cm (38 to 49 inches). Dusky red (10R 3/4) clay; weak coarse prismatic structure; very firm; continuous thin clay films on faces of prisms; 1 to 2 percent fine and medium subrounded polished quartz pebbles; slightly acid; abrupt wavy boundary.

IIB26(tb) 70L919 124 to 160 cm (49 to 63 inches). Dusky red (10R 3/4) clay; weak coarse prismatic structure; very firm; common thin clay films on faces of prisms; 1 to 2 percent fine and medium subrounded polished quartz pebbles; slightly acid; clear wavy boundary.

IIB3(tb) 70L920 160 to 180 cm (63 to 71 inches). Olive brown (2.5Y 4/4), light yellowish brown (2.5Y 6/4), brown (10YR 5/3) and yellowish brown (10YR 5/4) sandy clay loam; weak medium angular blocky structure; firm; thin,

SOIL CLASSIFICATION- AERIC HAPLAQUEPT; COARSE-LOAMY,
MIXED, NONACID, FRIGID

SERIES - - - - -SHERRY TAXADJUNCT

SOIL NO - - - - - S70WIS-71-4 COUNTY - - - MOOD

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 70L943-70L951

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, NTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -															RATIO		
		SAND	SILT	CLAY	FINE	VCOS	CORS	MEOS	FNES	VFNS	FMS1	VFS1	FMS1	VFS1	FMS1	VFS1	INTR	CLAY	NON-
CM		2-	.05-	LT	CLAY	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	.002	.002	2-	TO	CLAY
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.002	.002	.002	.02	CLAY	TO
		PCT LT 2MM - - - - -															PCT	PCT	CLAY

000-10	AP1	11.0	63.9	25.1	10.6	.4	2.2	3.0	2.4	3.0	27.2	36.7	9.5	8.0	31.2	42			.59
010-23	AP2	12.6	63.1	24.3	9.7	.4	2.5	3.3	3.0	3.2	27.6	35.5	8.8	9.4	31.9	40			.54
023-35	81	14.2	60.9	24.9	8.9	.6	2.7	4.1	3.8	3.0	26.2	34.7	5.7	11.2	30.7	36			.46
035-52	821T	17.3	55.5	27.2	11.4	.5	3.4	5.3	4.6	3.5	28.3	27.2	3.4	13.8	33.6	42			.45
052-83	2822T	60.0	25.4	14.6	6.8	3.8	12.8	20.1	17.2	6.1	13.0	12.4	2.0	53.9	25.1	47			.48
083-124	2831T	74.2	16.3	9.5	5.1	5.4	14.6	21.6	24.3	8.3	10.6	9.7	1.1	65.9	27.7	54			.46
124-141	2B 32T	32.9	50.3	16.8	7.5	2.0	4.8	5.3	10.7	10.1	15.1	35.2	4.5	22.0	31.2	45			.61
141-171	2C1	33.3	48.5	18.2	8.6	4.1	6.4	4.3	9.2	9.3	14.1	34.4	4.4	24.0	28.8	47			.53
171-211	2C2	30.3	52.3	17.4	7.5	3.2	6.0	3.5	7.4	10.2	18.8	33.5	3.4	20.1	33.4	43			.50

DEPTH		PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2 (- - - - -)										BULK DENSITY (- - - - -)				WATER CONTENT (- - - - -)				CARBONATE (- - - - -)			
		VOL. (- - - - -)					WEIGHT (- - - - -)					4A1D	4A1M	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E	
GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN COLE			1/10	1/3-	15-	WRD					LT	LT	1/1	1/2	
Z	75	.074					PCT	BAR	DRY			BAR	BAR	BAR	CM/				2	.002	H2O	CACL	
CM	PCT	PCT	(- - - PCT LT 75 - - -)			LT20	6/GC	6/GC			PCT	PCT	PCT	CM					PCT	PCT			

000-10	TR	0	0	TR	TR	91	TR	1.08	1.20	.037	37.0	35.9	14.8	.23	2.88					4.4	4.2
010-23	TR	0	0	TR	TR	90	TR	1.15	1.29	.040	38.2	37.5	13.0	.29	3.68					4.5	4.2
023-35	TR	0	0	TR	TR	88	TR	1.45	1.59	.032	31.1	29.3	11.4	.26	3.08					4.8	4.1
035-52	1	0	0	TR	1	84	1	1.47	1.65	.039	27.9	26.1	12.1	.20	2.08					5.1	4.4
052-83	6	0	TR	4	7	39	11	1.61	1.84	.043	17.3	15.8	7.0	.13	3.18					6.1	5.5
083-124	15	0	TR	7	14	25	20	1.80	1.91	.017	13.9	11.4	4.4	.11	4.68					6.5	6.0
124-141	1	0	0	TR	2	72	2	1.70A					10.3							6.6	6.2
141-171	5	0	0	1	8	66	9	1.70A					9.6							6.8	6.2
171-211	1	0	0	1	75	1	1.68	1.83	.029	23.0	21.8	8.7	.22	2.38						6.8	6.4

DEPTH	ORGANIC MATTER			IRON	PHOS	(- - -EXTRACTABLE BASES 5B4A- -)				ACTY	AL	(CAT EXCH)	RATIO	RATIO	CA	(BASE SAT)		
	6A1A	6B1A	C/M	6C2B	6N2E	6O2D	6P2B	6Q2B		6M1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1
	ORG	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	SAT	EXTB	NHAC
	CARB			FE						EXTB	TEA	EXT	ACTY		TO	CA	ACTY	
CM	PCT	PCT		PCT	PCT	(- - - - -	- - - - -	- - - - -	- - - - -	-MEQ / 100	G-	- - - - -	- - - - -	- - - - -	CLAY	MG	PCT	PCT

000-10	4.21C	.338	12	0.5	9.0	3.7	0.3	0.5	13.5	18.8	1.4	32.3	25.5	1.02	2.4	35	42	53
010-23	3.24	.277	12	0.5	7.7	3.4	0.2	0.4	11.7	18.0	1.6	29.7	23.1	0.95	2.3	33	39	51
023-35	0.53	.070	8	0.9	7.2	4.3	0.2	0.3	12.2	11.6	1.7	23.8	18.7	0.75	1.6	39	51	65
035-52	0.20	.034		1.0	9.2	6.7	0.2	0.4	16.5	7.7	0.9	24.2	20.0	0.74	1.4	46	68	83
052-83	0.07	.011		1.4	6.4	4.0	0.1	0.3	10.8	3.8		14.6	11.2	0.77	1.6	57	74	96
083-124	0.04			1.4	3.5	2.4	TR	0.2	6.1	2.1		8.2	6.2	0.65	1.5	56	74	98
124-141	0.08			2.1	12.6	6.7	0.1	0.5	19.9	2.7		22.6	19.8	1.18	1.9	64	88	101
141-171	0.07			2.1	8.9	5.5	0.2	0.4	15.0	1.6		16.6	14.8	0.81	1.6	60	90	101
171-211	0.03			2.3	7.9	4.7	0.2	0.4	13.2	1.2		14.4	12.7	0.73	1.7	62	92	104

DEPTH	SATURATED PASTE (- - - - -)				SALT GYP (- - - - -)				SATURATION EXTRACT 8A1- (- - - - -)				ATTERBERG			
	BE1	8C1B	8A	5D2	SE	8D5	6F1A	8A1A	6N1B	6O1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT

000-10																	480	11
010-23																		
023-35																		
035-52																		
052-83																	240	7
083-124	8500	6.1	17.1			20		0.15	0.6	0.5	0.3	TR						
124-141																		
141-171																	410	14
171-211																		

(A) ESTIMATED.

(B) MICRO-PENETRATION RESISTANCE - A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 1/10- BAR, A DISTANCE OF 0.6 CM USING A POCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCONFINED COMPRESSIVE STRENGTH.

(C) ORGANIC CARBON IS 11 KG/M SQ TO A DEPTH OF 1 M (6A).

(D) DETERMINED BY SOIL MECHANICS LAB - SCS, LINCOLN, NE.

Soil classification: Aeric Haplaquept; coarse-loamy, mixed, nonacid, frigid.

Soil: Sherry taxadjunct*.

Soil No.: STOWI-71-4.

Location: Wood County, Wisconsin; NW $\frac{1}{4}$, NW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 4, T. 24 N., R. 5 E.; 200 feet south of county road.

Climate: Humid continental; mean annual temperature is about 43° F, mean annual precipitation is about 30 inches; and frost-free season is about 133 days.

Vegetation and land use: Native vegetation was sedge and water-tolerant trees. Much of this land is idle or in forest. Some areas are cleared and used for general farming.

Parent material: Thin silty sediments over loamy residuum from micaceous schist.

Physiography: Depressional or nearly level areas in rock-controlled upland.

Topography: Nearly level site with 1 percent slope in a pasture.

Drainage: Poorly drained.

Ground water: Deep - perched water table exists near the surface for short periods.

Erosion: None

Permeability: Moderately slow to slow.

Described by: Paul R. Carroll

(Colors are for moist conditions unless otherwise stated)

Ap1 70L943 0 to 10 cm (0 to 4 inches). Black (10YR 2/1) and very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; common fine prominent mottles of strong brown (7.5YR 4/6-4/8); moderate fine subangular blocky structure; friable; strongly acid; clear wavy boundary.

Ap2 70L944 10 to 23 cm (4 to 9 inches). Very dark gray (10YR 3/1) silt loam mixed with a small amount of dark gray (10YR 4/1) from the B1 horizon below and having many fine prominent mottles of yellowish red (5YR 4/6-4/8); weak fine subangular blocky structure; friable; strongly acid; abrupt smooth boundary.

B1 70L945 23 to 35 cm (9 to 14 inches). Dark gray (10YR 4/1) heavy silt loam with many fine and medium prominent mottles of strong brown (7.5YR 5/6-5/8) and yellowish red (5YR 5/6-5/8); weak medium subangular blocky structure; firm; few thin interfingers of clean silt from an old A2 horizon above; few black (10YR 2/1) organic stains on faces of some peds; strongly acid; clear wavy boundary.

B21t 70L946 35 to 52 cm (14 to 20 inches). Dark gray (10YR 4/1) light silty clay loam with many fine and medium prominent mottles of strong brown (7.5YR 5/6-5/8) and yellowish red (5YR 5/6-5/8); weak medium angular and subangular blocky structure; firm; few thin clay films on faces of peds and in continuous tubular pores; medium acid; clear wavy boundary.

IIB22t 70L947 52 to 83 cm (20 to 33 inches.) Variegated yellowish brown (10YR 5/6-5/8), strong brown (7.5YR 5/6-5/8), dark yellowish brown (10YR 4/4) and dark brown (7.5YR 4/4) sandy clay loam with few medium prominent mottles of brown (7.5YR 4/2-5/2); moderate medium angular blocky structure; very firm; many thin dark brown (7.5YR 3/2) clay films on faces of peds and in tubular pores; slightly acid; gradual wavy boundary.

IIB31t 70L948 83 to 124 cm (33 to 49 inches). Dark brown (7.5YR 4/4) and reddish brown (5YR 4/4) sandy loam; weak medium and coarse subangular blocky structure; friable; few thin clay films on faces of peds and as clay bridging of sand grains; neutral; clear wavy boundary.

IIB32t 70L949 124 to 141 cm (49 to 56 inches). Reddish brown (5YR 4/4) and dark reddish brown (2.5YR 3/4) loam; weak medium subangular blocky structure; firm; few thin dark reddish brown (5YR 3/4) clay films on faces of peds and in tubular pores; neutral; clear wavy boundary.

IIC1 70L950 141 to 171 cm (56 to 68 inches). Dark reddish brown (5YR 3/2) and dark brown (7.5YR 3/2), brown (7.5YR 4/2-5/2) rubbed (pearly luster) loam; weak medium and coarse platy structure; firm; few thin clay films in root pores; neutral; clear wavy boundary.

IIC2 70L951 171 to 211 cm (68 to 84 inches). Variegated dark reddish brown (5YR 3/2-3/3), (pearly luster on rubbing), yellowish brown (10YR 5/6-5/8) and olive (5Y 4/3) loam; weak medium and coarse platy structure; firm; few thin clay films in root pores; neutral.

Additional notes: Temperature measurements: 50 cm depth - 14.2° C.
100 cm depth - 12.7° C.
150 cm depth - 11.5° C.

*This pedon lacks an argillic horizon; therefore, it is a taxadjunct to the Sherry series.

SOIL CLASSIFICATION- EUTRIC GLOSSOBORALF
 CCARSE-LCAPY,PIXEC
 SERIES - - - - -STAMBAUGH TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
 SOIL CONSERVATION SERVICE, MYSC
 NATIONAL SOIL SURVEY LABORATORY
 LINCOLN, NEBRASKA

SOIL NO - - - - - 572N1-21-7 CCUNTY - - - FOREST

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 72L860-72L868

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -															RATIO		
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	VFSI	SAND	INTR	FINE	NON-	801
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	2-	.2-	TO	CLAY	COS-	15-
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.10	.02	CLAY	TO	CLAY	BAR
		PCT LT 2MM - - - - -															PCT	PCT	CLAY
000-5	A1	17.9	71.9	10.2	3.5	.9	3.2	3.7	2.6	7.5	36.6	35.3	10.4	45.0	34				.84
C05-10	A2	18.3	74.0	7.7	1.5	1.7	3.2	3.7	2.3	7.4	37.0	37.0	10.9	45.3	19				.48
010-20	B21H1R	19.1	72.9	8.0	1.0	1.4	3.4	3.4	2.6	8.3	37.8	35.1	10.8	47.1	13				.86
C20-36	B221R	19.3	74.6	6.1	.3	.9	3.1	3.4	2.4	9.5	39.3	35.3	9.8	49.7	5				.88
036-59	A2	17.8	74.0	8.2	.7	.9	2.3	2.8	2.1	9.7	38.6	35.4	8.1	49.2	9				.65
C59-75	A6B	20.8	65.7	13.5	3.3	1.2	3.3	4.1	2.5	9.7	35.3	30.4	11.1	45.9	24				.48
075-96	2B*21T	32.8	54.5	12.7	3.8	2.3	7.2	8.1	4.9	10.3	30.4	23.9	22.5	42.4	30				.48
C96-113	2B*22T	37.1	34.0	8.9	2.2	5.3	16.9	18.5	9.8	6.6	18.6	15.4	50.5	27.8	25				.44
113-165	2C	94.2	3.6	2.2	.8	15.3	37.3	25.8	13.8	2.0	1.6	2.0	92.2	7.6	36				.59

DEPTH	(PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2) (BULK DENSITY) (- - - - - WATER CONTENT - - -) CARBONATE (- - PH - -)																		
	VOL. (- - -)	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	6E1B	3A1A	8C1A	8C1E	
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/	2	.002	M20	1/2	
CM	PCT	PCT	(- - -)	PCT	LT 75	(- - -)	LT20	6/CC	6/CC		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	CACL
000-5	1	0	3	1	1	84	2	1.0	A					8.6				5.2	4.8
C05-10	2	0	3	TR	4	82	4	1.1	A					3.7				4.8	4.2
010-20	2	0	0	2	2	85	4	1.19	1.26	.019	34.2	32.0	6.9	.29	.78			4.7	4.1
C20-36	2	0	0	2	2	86	4	1.18	1.21	.008	39.0	31.9	5.4	.31	1.18			4.8	4.2
036-59	1	0	0	1	1	89	2	1.4	A					5.3				4.9	4.1
C59-75	1	0	TR	1	2	86	3	1.57	1.62	.010	22.6	21.3	6.5	.23	4.18			4.9	4.1
075-96	5	0	5	4	3	67	7	1.59	1.67	.016	22.6	20.4	6.1	.22	3.18			4.9	4.1
C96-113	2C	TR	10	9	8	35	17	1.81	1.89	.013	13.6	12.0	3.9	.13	6.38			4.9	4.2
113-165	45	5	20	20	10	3	37	1.6	A					1.3				5.1	4.4

DEPTH	(ORGANIC MATTER)		IRON	PHOS	(- - - EXTRACTABLE BASES 5B4A - -)				ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)		
	6A1A	6B1A	C/K	6C2B	6N2E	6C2D	6P2B	6Q2B	6H1A	6G1E	5A3A	5A6A	8D1	8D3	5F1	5C3	5C1	
	ORGN	NITE		EXT	TCTL	CA	MG	KA	K	SUM	BACL	KCL	EXTB	NHAC	CA	SAT	EXTB	NHAC
CM	PCT	PCT		PCT	PCT	(- - -)	-NEQ / 100	-	EXTB	TEA	EXT	ACTY	CLAY	MG	PCT	PCT	PCT	PCT
000-5	3.73C	.27B	13	.8	8.5	1.8	.1	.4	10.8	11.8	.1	22.6	17.7	1.74	4.7	48	48	61
C05-10	.87	.679	11	.5	1.9	.5	.1	.2	2.7	7.1	1.4	9.8	8.4	1.09	3.8	23	28	32
010-20	1.81	.110	16	1.4	1.5	.3	.1	.2	2.1	19.8	3.3	21.9	14.7	1.84	5.0	10	10	14
C20-36	1.24	.690	14	1.0	.6	.1	.1	.1	.9	16.1	2.7	17.0	11.3	1.85	6.0	5	5	8
036-59	.31			1.1	1.5	.5	.1	.1	2.2	10.4	3.6	12.6	9.8	1.20	3.0	15	17	22
C59-75	.12			1.0	3.1	1.3	.1	.2	4.7	9.1	3.3	13.8	11.2	.83	2.4	28	34	42
075-96	.12			1.3	3.3	1.5	.1	.2	5.1	8.3	2.1	13.4	10.9	.86	2.2	30	38	47
C96-113	.05			.9	2.7	1.3	.1	.2	4.3	4.4	1.2	8.7	7.6	.85	2.1	36	49	57
113-165																		

DEPTH	(SATURATED PASTE)				NA	AA	SALT	GYP	(- - - - - SATURATION EXTRACT 8A1- - - - -)													ATTERBERG		
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6Q1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2					
	REST	PH	M2C	ESP	SAR	TCTL		EC	CA	MG	NA	K	CO3	HC03	CL	SO4	NO3	LQ1D	PLST					
	OHM					SCLU		MMHCS/										LM1T	INDX					
CM	CM		PCT	PCT		PPH	PCT	CM	(- - - - -)	- MEQ / LITER - - - - -)													PCT	
C00-5																								
C05-10																								
C10-20																		320	70					
C20-36	34000	4.8	42.7					.14																
C36-59																		230	40					
C59-75																								
C75-96																								
C96-113	9000	4.6	20.3					.20																
113-165																								

IDENTIFICATION OF THE SPECIFIC HORIZON BY LABORATORY CRITERIA.

DEPTH	HORIZON	(PYROPHOSPHATE,PH10)		(CIT - OIT)		(PYROPHOSPI)		PYRO	CEC
		6C5A	6G5A	6A1B	6C2B	6G7A	FE+AL	AL+C	FE+AL
		EXT	EXT	EXT	EXT	EXT	/	/	CLAY
		FE	AL	C	FE	AL	CLAY	CLAY	C - D
CM		PCT	PCT	PCT	PCT	PCT	CLAY	CLAY	THIC
010-20	B21H1R	.8	.4		1.4	.3	.15	.71	107
020-36	B221R	.4	.4		1.0	.4	.13	.57	132

- (A) ESTIMATED.
 (B) MICRO-PENETRATION RESISTANCE. A ROD 0.6 CM DIA IS SLOWLY PUSHED INTO BULK DENSITY CLOD, EQUILIBRATED AT 0.1-BAR, A DISTANCE OF 0.6 CM USING A PCKET PENETROMETER. UNITS ARE FORCE (KG) AND NOT ESTIMATES OF UNCCNFIED COMPRESSIVE STRENGTH.
 (C) ORGANIC CARBON IS 8 KG/M SQ TO A DEPTH OF 1 M (6A).
 (D) BY USDA-SCS, SOIL MECHANICS LAB, LINCOLN, NE.

Soil classification: Eutric Glossoboralf; coarse-loamy, mixed.
 Soil: Stambaugh taxadiunct*.

Location: Forest County, Wisconsin; NW $\frac{1}{4}$, NW $\frac{1}{4}$, Sec. 13, T. 37 N., R. 13 E.; near Highway 55.

Climate: Humid continental; mean annual temperature ranges from 40° to 45° F; mean annual precipitation ranges from 28 to 34 inches; and frost-free season is 130 to 135 days.

Vegetation and land use: Native vegetation was mixed northern hardwoods and conifers. Cutover areas are presently in aspen. About 30 percent of this soil is cleared and used for general farming. Some wooded areas are pastured.

Parent material: Silt (probably loess) over acid sand and gravel glacial outwash.

Physiography: Nearly level to sloping glacial outwash plains and stream benches.

Topography: Site is on a 1 percent plane slope in a second growth stand of hardwood and conifer trees.

Drainage: Moderate and well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: Steve Payne and Robert Fox.

Sampled by: Robert H. Jordan and Robert L. Juve, September 22, 1972

(Colors are for moist soils unless otherwise stated)

A1 72L860 0 to 5 cm (0 to 2 inches). Dark reddish brown (5YR 2/2) silt loam; weak fine granular structure; friable; many roots; about 5 percent medium gravel; strongly acid; abrupt boundary.

A2 72L861 5 to 10 cm (2 to 4 inches). Brown (7.5YR 5/2) silt loam; weak fine subangular blocky structure; very friable; roots common; about 5 percent medium gravel; strongly acid; abrupt boundary.

B21hr 72L862 10 to 20 cm (4 to 8 inches). Reddish brown (5YR 4/3) silt loam; weak fine subangular blocky structure; very friable; many roots; few fine pores; strongly acid; clear boundary.

B22tr 72L863 20 to 36 cm (8 to 14 inches). Brown (7.5YR 4/4) silt loam; weak fine subangular blocky structure; very

A'2 72L864 36 to 59 cm (14 to 23 inches). Brown (7.5YR 5/4) silt loam; weak medium platy structure parting to weak fine subangular blocky structure; friable; vesicular; few roots; strongly acid; abrupt boundary.

A&B' 72L865 59 to 75 cm (23 to 30 inches). Brown (7.5YR 5/4 and 4/4) silt loam; weak fine subangular blocky structure; friable; few tongues of brown (7.5YR 4/4) silt loam B't extend into this horizon; strongly acid; clear boundary.

IIB'21t 72L866 75 to 96 cm (30 to 38 inches). Brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; firm; about 5 percent fine gravel; common thick patchy clay films; slightly vesicular; strongly acid; clear boundary.

IIB'22t 72L867 96 to 113 cm (38 to 45 inches). Brown (7.5YR 4/2) heavy sandy loam; weak medium subangular blocky structure; firm; thick patchy clay films; about 5 percent of medium gravel and 15 percent of fine gravel; a few fine pores; strongly acid; clear boundary.

SOIL CLASSIFICATION-TERRIC BOROSAPRIST
SANDY OR SANDY-SKELETAL, MIXED, EUTIC
SERIES - - - - -TAWAS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE, MTSC
NATIONAL SOIL SURVEY LABORATORY
LINCOLN, NEBRASKA

SOIL NO - - - - - S74W1-75-1 COUNTY - - - MARINETTE

GENERAL METHODS- - -1A,1B1B,2A1,2B

SAMPLE NOS. 74L857-74L863

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B													RATIO								
		SAND			SILT			CLAY			INTR			FINE			NON-						
		2-	.05-	LT	CLAY	LT	VCOS	CCRS	HEDS	FNES	VFNS	COSI	FNSI	VPSI	SAND	II	CLAY	TO	CO3-	BDI			
		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.002	.10	.02	CLAY	PCT	PCT	CLAY			
CM		PCT LT 2MM													PCT			PCT			CLAY		

000-018	CAP																		
018-036	CA2																		
036-056	CA3																		
056-076	CA4																		
076-092	CA5																		
092-097	2C1	56.9	25.0	18.1		.1	1.7	11.3	34.3	9.5	8.8	16.2		47.4				1.41	
097-150	2C2	90.1	8.0	1.9		.2	3.5	21.4	54.5	10.5	5.9	2.1		79.6				1.7	

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	4B1C	4B1C	4B1C	4B1C	4B1C	4B1C	4B1C	4B1C	6E1B	3A1A	8C1A	8C1E	1-	2-
	2	75				.074	PCT	BAR	DRY		8AR	BAR	BAR	BAR	CM	CM	CM	CM	LT	LT	1/1	1/2		
CM	PCT	PCT	PCT LT 75				LT20	G/CC	G/CC		PCT	PCT	PCT	PCT	CM	CM	CM	CM	PCT	.002	H2O	CACL		
000-018	TR	0	0	0	TR		TR	.27	.57		337	296	90.5	.66								6.6	6.1	
018-036	0	0	0	0	0		0	.28	.50		302	247	92.2	.59								6.2	6.0	
036-056	0	0	0	0	0		0	.25	.43		362	317	137	.56								6.0	5.7	
056-076	0	0	0	0	0		0	.22	.43		415	369	105	.68								5.5	5.7	
076-092	0	0	0	0	0		0							84.3								5.7	5.6	
092-097	0	0	0	0	TR		TR							25.5								6.2	6.2	
097-150	1	0	0	TR	1		1							3.9								4.7	4.6	

DEPTH	ORGANIC MATTER			IRON	PHOS	EXTRACTABLE BASES 5B4A-				ACTY	AL	CAT EXCH		RATIO		RATIO		CA	BASE SAT		
	6A1A	6B1A	C/N	6C2B	6N2E	6O2D	6P2B	6Q2B	SUM	6H1A	6G1E	5A3A	5A6A	8D1	8D3	CA	5F1	5C3	5C1	EXTB	NHAC
	ORGN	NITG		EXT	CA	MG	NA	K	EXTB	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	NHAC	ACTY	EXTB	NHAC	
CM	PCT	PCT		PCT	PCT				MEQ / 100	TEA	EXT	ACTY	ACTY	TO	TO	MG	PCT	PCT	PCT	PCT	PCT
000-018	47.1	1.86	25		184	46.3	.5	.5	231	39.5		270	189		4.0	97	85	122			
018-036	49.8	1.96	25		135	39.0	.3	.1	174	48.4		223	162		3.5	83	78	108			
036-056	49.8	1.71	29		151	45.2	.3	.1	197	53.6		250	180		3.3	84	79	109			
056-076	46.7	1.96	24		126	39.8	.2	.1	166	58.8		225	147		3.2	86	74	113			
076-092	28.6	2.31	12		84.7	27.4	.2	.2	113	46.4		159	102		3.1	83	71	110			
092-097	5.69	.336	17		28.2	10.3	.1	.2	38.8	13.4		52.2	30.8		2.7	92	74	126			
097-150	1.10	.033	33		7.5	4.7	TR	TR	12.2	.8		13.0	3.8		1.6	197	94	321			

DEPTH	(SATURATED PASTE)			NA	NA	SALT	GYP	SATURATION EXTRACT										8A1-		ATTERBERG				
	8E1	8C1B	8A	5D2	5E	8D5	6F1A	8A1A	6N1B	6D1B	6P1B	6Q1B	6I1A	6J1A	6K1A	6L1A	6M1A	4F1	4F2					
	REST	PH	H2O	ESP	SAR	TCIL		EC	CA	MG	NA	K	CO3	CO3	CL	SO4	NO3	LOID	PLST					
	OHM-					SDU		MMHOS/										LMIT	INDX					
CM	CM	PCT	PCT			PPM	PCT	CM					MEQ / LITER					PCT						
000-018	1700	6.9	477.0			3500		.95	6.9	4.2	.4	.1	0	5.2	.0	3.8	1.7							
018-036	1400	5.7	552.0			4400		1.05	7.3	4.9	.2	TR	0	.6	.0	12.0	1.3							
036-056	1000	5.5	632.0			9100		1.65	13.1	9.2	.2	.1	0	.6	.0	23.5	.0							
056-076	650	5.2	555.0			15000		2.74	25.1	17.0	.2	.1	0	1.5	.3	44.4	.0							
076-092	610	5.3	358.0			11000		3.09	28.5	19.0	.2	.1	0	.6	.5	49.1	.0							
092-097	620	4.7	150.0			5000		3.29	27.5	24.1	.2	.2	0	.6	.5	53.1	.0							
097-150	960	6.2	28.9			1900		4.55	25.1	56.8	.2	.1	0	1.8	.5	76.3	.0							

DEPTH	HISTOSOL CHARACTERIZATION										WATER CONTENT			
	8F	8G	8H	8C1E	4A3A	4A1I	4D1	RES-	4B4	4B1C	4B2	4C1	15-	WRD
	MINL	(FIBER VOL)	PYROPHOSPHT	.01M	FILD	1/3B	RE-	IDUE	FILD	1/3B	RE-	BAR	CM/	
CM	CCNT	UNRB	RUE	SCULBILITY	CACL	STAT	RENT	WET	PCT	PCT	PCT	PCT	CM/	
000-018	25	30A	8A	10YR 3/2	6.6	.25		70	309		90.5			
018-036	22	16	3	10YR 3/2	6.1	.21		768	365		80.6			
036-056	18	26	5	7.5YR 4/4	5.0	.18		82	451		82.0			
056-076	19	34	7	7.5YR 5/2	5.4	.18		81	456		85.3			
076-092			1	10YR 2/2	5.6						73.4			
092-097											16.2			
097-150											1.7			

(A) INCLUDES LIVE RCTYS (10-15 PCT).
(B) TREATED AS HALF SURFACE AND HALF SUBSURFACE.

Soil classification: Terric Borosaprist; sandy or sandy-skeletal, mixed, euic.

Series: Tawas.

Soil No.: S74WI-75-1.

Location: Marinette County, Wisconsin; SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 9, T. 30 N., R. 20 E.; 200 feet north of county road and 60 feet east of fence line. About 45.1° north latitude and about 88.0 west longitude.

Climate: Humid continental. Mean annual temperature at Marinette is 45.8° F; mean July temperature is 71.9° F; mean January temperature is 20.4° F; mean annual precipitation is 28.19 inches, with nearly two-thirds of this during the growing season; total annual snowfall is 40.3 inches; the frost-free season is 143 days but less on the bog soil areas.

Parent material: Organic soil material derived primarily from woody remains with some herbaceous materials over fine and medium sands of outwash or lacustrine derivation.

Physiography: Shallow depression in a large lake plain. Area is nearly level to gently sloping and local relief is less than 6 feet. Elevation is about 900 feet.

Vegetation: Overstory of white cedar, black ash, American elm, soft maple with understory of tag alder, willow, spirea, and dogwood in virgin site to east. Area sampled has been in pasture for 30 years and has a cover of sedges, reedtop, bluegrass, and native forbs.

Size of area: Several hundred acres. Tawas occurs along the edge of the bog in a narrow belt several hundred feet wide bordering on the mineral soils.

Distance to adjacent mineral soils: 100 feet to the west.

Depth to water table: Surface was saturated to 25 cm. Water table was at 75 cm.

Microrelief: Low hummocks of 6 inches to 1 foot common over the area. Some of this was caused by cattle grazing.

Subsidence: Slight; some surface drainage had been achieved by a road ditch on the south side.

Soil temperature: Measured soil temperature of 14.7° C at 50 cm and 12.5° C at 70 cm.

Described and sampled by: G.W. Hudelson, A.J. Klingelhoets, G.B. Lee, W.E. McKinzie, and H. Lorenz on August 5, 1974. Samples were obtained from a pit dug with shovels.

Dep. 74857 0 to 18 cm. Black (7 RYZ 7/1) brown, fine, mottled, sandy, silty, moist.

SOIL CLASSIFICATION-TYPIC HAPLUDALF
FINE-LOAMY, MIXED, MESIC
SERIES - - - - - THERESA

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE NRCS
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - 568W1-8-3 COUNTY - - - CALUMET

GENERAL METHODS - - - 1A, 1B1B, 2A1, 2B

SAMPLE NOS. 68L1108-68L1117

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B - - - - -															RATIO		
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FNES	VFNS	COSI	FNSI	TEXT	FAML	INTR	FIVE	NON-	801
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	2-	TD	CLAY	CO3-	15-
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY	TO	CLAY	BAR
		PCT LT 2MM - - - - -															PCT	PCT	CLAY
000-10	A1	14.5	73.8	11.7	5.1	.5	1.5	2.3	4.5	5.7	36.6	37.2		8.8	44.7	44	12	.80	
010-18	A21	14.0	76.1	9.9	.6	1.4	2.2	4.2	5.6	36.6	37.5		9.4	46.5		10	.58		
018-25	A22	16.1	73.5	10.4	.4	1.7	2.6	5.2	6.2	37.5	36.0		9.9	46.5		10	.47		
025-36	B1	22.5	59.1	18.4	.9	2.8	4.0	8.2	6.6	30.0	29.1		15.9	41.0		18	.43		
036-46	B21T	34.4	42.9	22.7	7.1	2.3	4.7	6.8	13.1	7.5	18.2	24.7		26.9	32.6	31	23	.44	
046-61	B22T	34.1	36.5	29.4	9.2	2.4	5.1	6.2	12.9	7.5	12.9	23.6		26.6	27.4	31	29	.41	
061-86	B23	46.2	36.8	17.0		2.8	4.5	5.3	19.0	14.6	18.4	18.4		31.6	45.1		17	.36	
086-112	2C1	49.0	39.9	11.1		5.4	5.7	5.7	18.3	13.9	20.1	19.8		35.1	45.3		11	.39	
112-163	2C2	46.4	43.4	10.2	4.5	5.0	5.8	5.5	16.6	13.5	20.6	22.8		32.9	44.4	44	7	.37	
000-20	AP (A)																		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2(1) BULK DENSITY (1) - - - - -										WATER CONTENT - - - - -				CARBONATE (-PH - - -)			
	VOL. (1)	WEIGHT	4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1		6E1B	3A1A	8C1A	8C1E				
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-10	TR	0	0	TR	TR	90	TR	1.108				9.4		TR		7.0	6.5	
010-18	TR	0	0	TR	TR	90	TR	1.27	1.31	.011		25.0	5.7	.25	0	6.8	6.1	
018-25	TR	0	0	TR	TR	88	TR	1.41	1.43	.005		19.9	4.9	.22	0	6.2	5.5	
025-36	1	0	0	1	1	80	2	1.62	1.70	.016		18.2	8.0	.16	0	5.5	4.8	
036-46	2	0	0	1	1	68	2	1.70	1.79	.017		17.7	10.0	.13	0	5.6	5.0	
046-61	15	15	5	TR	TR	65	4	1.45	1.64	.035		23.5	12.1	.14	0	6.9	6.2	
061-86	20	15	5	10	TR	50	12	1.608				6.1			40	TR	7.9	7.0
086-112	25	5	15	10	5	40	20	1.80	1.86	.008	16.8	4.3	.17		53	TR	8.0	7.2
112-163	30	5	15	20	5	40	26	1.93	1.98	.006	14.7	3.8	.15		59	3	8.2	7.3
000-20	TR	0	0	TR	TR	TR	TR	1.45	1.51	.014		20.2	4.6	.23				

DEPTH	ORGANIC MATTER		IRON	PHOS	EXTRACTABLE BASES 5B4A- - - - -				ACTY	AL	CAT EXCH		RATIO	RATIO	CA	(BASE SAT)	
	6A1A	6B1A	C/N	6C2A	6S1A	6N2E	6O2D	6P2A	6Q2A		6H1A	6G1D	5A3A	5A6A	8D1	8D3	5F
	ORG	NITG		EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT
CM	PCT	PCT		PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT
000-10	3.89C	.269	14	0.9		20.8	5.2	TR	0.3	26.3	5.4		31.7	21.1	1.80	4.0	99
010-18	1.68	.120	14	0.9		8.0	3.6	0.1	0.2	11.9	5.0		16.9	11.6	1.20	2.2	69
018-25	0.75	.053	14	1.0		4.3	2.6	0.1	0.1	7.1	5.6		12.7	8.7	1.84	1.7	49
025-36	0.46	.037	12	1.3		5.5	3.4	0.1	0.2	9.2	7.6		16.8	12.3	0.67	1.6	45
036-46	0.38	.031	12	1.5		7.4	4.9	0.1	0.3	12.7	7.0		19.7	14.9	0.66	1.5	50
046-61	0.38	.035	11	1.8		10.7	7.6	0.1	0.4	18.8	4.5		23.3	18.9	0.64	1.4	57
061-86	0.30			0.8		5.00	3.30	0.1	0.2	8.6				8.9	0.52		
086-112	0.19			0.4		3.50	2.30	0.1	0.1	6.0				5.0	0.45		
112-163	0.12			0.5		3.00	1.90	0.1	0.1	5.1				4.0	0.39		
000-20	1.58																

DEPTH	(SATURATED PASTE)		NA	NA	SALT	GYP	SATURATION EXTRACT 8A1- - - - -				ATTERBERG			
	8E1	8C1B	8A	5D2	SE	8D5	6F1A	8A1A	6N1B	6O1B	6P1A	6Q1A	6I1A	6K1A
	REST	PM	H2O	ESP	SAR	TOTL	EC	CA	MG	NA	K	CO3	HCO3	CL
CM	CM	PCT	PCT			PPM	PCT	CM	CM	CM	CM	CM	CM	CM
000-10														
010-18														
018-25														
025-36	5800	5.1	47.5			80		0.27						
036-46														
046-61														
061-86														
086-112	5800	7.8	33.4			90		0.41						
112-163														
000-20														

CLAY MINERALOGY (7A2C).

036-46 P11 K11 MVL.

046-61 P11 K11 MVL.

COMMENTS - BY INFERENCE, A CONSIDERABLE AMORPHOUS COMPONENT IS PRESENT. CLAY MINERALOGY IS MIXED.

RELATIVE AMOUNTS - (X-RAY) 5 = DOMINANT 4 = ABUNDANT 3 = MODERATE 2 = SMALL 1 = TRACE.

MINERAL CODE - MI = MICA KK = KAOLINITE MV = MONTMORILLONITE-VERMICULITE.

(A) COLLECTED 90 M SOUTH OF 8-3 FROM A FIELD OF ALFALFA-BROME.

(B) ESTIMATED.

(C) ORGANIC CARBON IS 10 KG PER SQ M TO A DEPTH OF 1 METER (METHOD 6A).

(D) METHODS 6NAC FOR CA AND 6QAC FOR MG.

(E) LL AND PI BY SOIL MECHANICS LAB, USDA-SCS, LINCOLN, NE.

Soil classification: Typic Hapludalfs; fine-loamy, mixed, mesic.

Soil: Theresa.

Soil No.: S68WI-8-3.

Location: Calumet County, Wisconsin; SE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 1, T. 17 N., R. 20 E.; 150 feet north of road and 25 feet east of logging road in small woodlot.

Climate: Humid continental. Average annual air temperature ranges from 47° to 51° F; average annual precipitation is about 21 to 31 inches; frost-free season is 130 to 140 days.

Vegetation and land use: Most of this soil, except for extremely stony areas, is cultivated and used for growing general farm crops. Native vegetation was maple-basswood forest.

Parent material: Thin silt mantle (10 to 30 inches thick) over highly calcareous light loam to sandy loam glacial till.

Physiography: Gently undulating to hilly drumlins and glacial till plains.

Topography: On a large drumlin with an east aspect. Slope is 1 percent. Site was about halfway down the slope.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: A. Klingelhoets, R. Fox, and E. Link, August 20, 1968.

(Colors are for moist conditions unless otherwise stated)

A1 68L1108 0 to 10 cm (0 to 4 inches). Very dark brown to very dark grayish brown (10YR 2/2 to 3/2) silt loam; weak medium subangular blocks parting to moderate fine crumb structure; friable; roots common; mildly alkaline; abrupt smooth boundary.

A21 68L1109 10 to 18 cm (4 to 7 inches). Dark brown (10YR 4/3) silt loam; weak coarse platy parting to weak fine subangular blocks; friable; (nondiagnostic B1r horizon is starting to develop); roots common; few large stones in this horizon; much earthworm activity; mildly alkaline; clear wavy boundary.

A22 68L1110 18 to 25 cm (7 to 10 inches). Brown (10YR 5/3) silt loam; moderate coarse platy structure; friable; roots common; few earthworm holes and casts; few large stones extending into this horizon; mildly alkaline; clear wavy boundary.

B1 68L1111 25 to 36 cm (10 to 14 inches). Dark brown (10YR 4/3) heavy silt loam; weak coarse plates parting to moderate fine and medium subangular blocks; firm when moist; few large stones; roots common; light gray (10YR 7/2) silt coatings on vertical faces of peds; slightly acid; gradual wavy boundary.

B21t 68L1112 36 to 46 cm (14 to 18 inches). Dark yellowish brown (10YR 4/4) silty clay loam; moderate fine and medium subangular blocky structure; firm when moist; thin patchy clay films and light gray (10YR 7/2) silt coatings on faces of peds; roots common; few pebbles and stones; slightly acid; clear wavy boundary.

IIB22t 68L1113 46 to 61 cm (18 to 24 inches). Dark brown (7.5YR 4/4) heavy clay loam; moderate medium angular and subangular blocky structure; firm when moist; thick patchy clay films with dark brown (7.5YR 4/2) color; at the contact with the B3 there is a thin discontinuous beta B with some dark brown (7.5YR 3/2) organic stains; roots common; stones 3/4 to 3 inches in diameter constitute 3 percent of the volume and stones over 3 inches in diameter make up 10 percent of the volume; neutral; clear wavy boundary.

IIB3 68L1114 61 to 86 cm (24 to 34 inches). Dark brown (7.5YR 4/4) in upper part, grading to brown (7.5YR 5/4) in the lower part heavy loam; weak to moderate medium subangular blocky structure; firm when moist; many remnants of partially weathered dolomite pebbles; few thin patchy clay films; stones 3/4 to 3 inches in diameter make up 3 percent of the volume and stones over 3 inches in diameter make up 10 percent of the volume; roots common; moderately alkaline in places to calcareous around partially weathered dolomite pebbles; gradual irregular boundary.

IIC1 68L1115 86 to 112 cm (34 to 44 inches). Yellowish brown (10YR 5/4) loam; weak coarse platy structure parting to weak medium subangular blocks; friable; few tree roots; 10 percent of volume made up of stones 3/4 to 3 inches in diameter and 5 percent made up of stones over 3 inches in diameter; over 50 percent of the stones are dolomite; strong effervescence; gradual wavy boundary.

IIC2 68L1116 112 to 163 cm (44 to 64 inches). Yellowish brown (10YR 5/4) loam; weak medium subangular blocky structure; friable when moist; few tree roots in upper part; 5 percent of volume made up of stones over 3 inches in diameter and 10 percent made up of stones 3/4 to 3 inches in diameter; over 50 percent of the stones are dolomite; strong effervescence; rests abruptly on dolomite bedrock at 64 inches.

Remarks: Soil was moist when sampled. The glacial till is estimated to have over 30 percent calcium carbonate equivalent. Original vegetation is still present on this site.

Wooded site: Soil temperature at 10 inches - 20.0° C.
20 inches - 18.5° C.
40 inches - 16.0° C.

A plow layer sampled in a cultivated field, 100 feet south of the road directly across from the site in the woodlot had the following characteristics:

Pedon S68Wis-8-3(1)

Ap 68L1117 0 to 8 inches. Dark grayish brown to very dark grayish brown (10YR 4/2 to 3/2) moist; and grayish brown to light brownish gray (10YR 5/2 to 6/2) dry; silt loam; weak medium subangular blocks breaking to moderate very fine subangular blocky structure; friable when moist; mildly alkaline in reaction. Soil temperature at 10 inches - 19.5° C.

SOIL CLASSIFICATION-TYPIC HAPLUDALF

FINE-LOAMY, MIXED, MEDIUM

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

SERIES - - - - -THERESA

SOIL NO - - - - -S68W1-8-4

COUNTY - - - CALUMET

SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

GENERAL METHODS- -1A,1B1B,2A1,2B

SAMPLE NOS. 68L1118-68L1128

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B															RATIO		
						(- - - - - SILT - - - - -)													
		SAND	SILT	CLAY	FINE CLAY	VCOS	CORS	MEOS	FNES	VFNS	COFI	FNSI	VFSI	FAML	INTR	FINE	NON-	8D1	
		2- .05	.05- .002	LT .002	LT .0002	2- 1	1- .5	.5- .25	.25- .10	.10- .05	.05- .02	.02- .002	.002- .0005	SAND	.02	TO CLAY	CO3- CLAY	15- BAR	
CM					1	.5	PCT	LT 2MM							PCT	PCT	CLAY		
000-13	A1	19.3	67.6	13.1		.4	1.5	2.7	7.2	7.5	34.8	32.8		11.8	46.3		13	.80	
013-18	A21	20.5	69.9	9.6		.6	1.7	2.8	7.3	8.1	36.1	33.8		12.4	48.2		10	.51	
018-23	A22	21.9	68.3	9.8		.8	1.9	3.1	7.9	8.2	35.5	32.8		13.7	48.0		10	.42	
023-30	B1	21.9	59.8	18.3		.6	2.0	3.5	8.4	7.4	32.5	27.3		14.5	44.5		18	.39	
030-43	2B21T	26.3	44.1	29.6		1.6	3.1	4.5	10.4	6.7	21.4	22.7		19.6	33.6		30	.37	
043-58	2B22T	28.4	33.2	38.4		2.1	3.2	4.8	11.6	6.7	13.8	19.4		21.7	26.8		38	.39	
058-86	2B3T	54.2	32.7	13.1		2.6	4.1	5.5	23.3	18.7	17.5	15.2		35.5	51.1		13	.38	
086-104	2C1	56.4	34.5	9.1		8.8	6.8	6.8	20.1	13.9	16.3	18.2		42.5	42.1		9	.36	
104-142	2C2	48.6	41.4	10.0		5.4	5.3	5.9	18.4	13.6	18.4	23.0		35.0	43.0		10	.35	
142-178	2C3	46.2	42.1	11.7		5.2	6.0	6.3	16.8	11.9	17.4	24.7		34.3	39.1		10	.32	
000-15	AP (A)																		

DEPTH	PARTICLE SIZE ANALYSIS, MM, 3B, 3B1, 3B2)(BULK DENSITY				WATER CONTENT- - - - -)				CARBONATE		(-PH - -1	
	VOL. (- - - - - WEIGHT - - - - -)										4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E	
	GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD		LT	LT	1/1	1/2			
	2	75				.074	PCT	BAR	DRY		BAR	BAR	BAR	CM/		2	.002	H2O	CACL			
CM	PCT	PCT	(- - -	PCT	LT	75 - - -)	LT20	G/CC	G/CC		PCT	PCT	PCT	CM		PCT	PCT					
000-13	TR	0	0	TR	TR	86	TR	1.08	1.20	.037				34.6	10.5	.27	TR	0	6.9	6.6		
013-18	TR	0	0	TR	TR	85	TR	1.34	1.39	.013				24.9	4.9	.27	0		6.9	6.2		
018-23	TR	0	0	TR	TR	84	TR	1.46	1.50	.009	24.0				4.1	.30	0		6.9	6.0		
023-30	TR	0	0	TR	TR	83	TR	1.61	1.66	.011				17.3	7.1	.17	0		6.7	5.9		
030-43	TR	TR	TR	TR	TR	75	TR	1.508							11.0		TR	0	6.7	6.0		
043-58	15	20	5	TR	5	70	5	1.43	1.65	.041				25.3	15.1	.12	2	0	7.1	6.6		
058-86	25	15	15	10	TR	40	14	1.708							5.0		43	0	7.9	7.1		
086-104	35	15	15	20	5	30	29	1.808							3.3		50	0	8.0	7.2		
104-142	25	10	5	15	5	40	22	1.90	1.96	.008	14.3				3.5	.15	55	0	8.3	7.2		
142-178	25	15	10	15	TR	45	16	1.97	2.01	.005	12.6				3.8	.13	53	2	8.3	7.4		
000-20	2	0	0	2	1	3	1.47	1.57	.022					21.4	7.3	.20						

DEPTH	ORGANIC MATTER		IRON	PHOS	(-EXTRACTABLE BASES 5B4A- -)						ACTY	AL	(CAT EXCH)		RATIO	RATIO	CA	(BASE SAT)		
	6A1A	6B1A	C/N	6C2A	6S1A	6N2E	6O2D	6P2A	6Q2A	SUM	6H1A	6G1D	5A3A	5A6A	8D1	8D3	5F	5C3	5C1	
CM	ORGN	NITG		EXT	TOTL	CA	MG	VA	K	EXTB	TEA	EXT	ACTY	NHAC	NHAC	TD	TD	NHAC	ACTY	NHAC
	PCT	PCT		PCT	PCT					-NEQ / 100	G-					CLAY	MG	PCT	PCT	PCT
000-13	4.30C			1.0	19.8	7.2	0.1	0.3	27.4	5.4			32.8	23.9	1.80	2.8	83	84	115	
013-18	1.47			0.9	7.2	3.7	TR	0.2	11.1	5.5			16.6	11.1	1.20	1.9	65	67	100	
018-23	0.68			0.9	4.4	2.7	TR	0.1	7.2	3.7			10.9	7.6	0.78	1.6	58	66	95	
023-30	0.46			1.2	6.7	4.3	0.1	0.2	11.3	4.6			15.9	11.9	0.65	1.6	56	71	95	
030-43	0.41			1.8	7.10	6.90	0.1	0.4	14.5	5.3	19.8	19.0	0.64	1.0		37	73	76		
043-58	0.50			1.9	13.20	9.70	0.1	0.5	23.5				23.9	0.62						
058-86	0.38			0.7	5.00	2.90	0.1	0.2	8.2				8.0	0.61						
086-104	0.30			0.5	3.20	1.90	TR	0.1	5.2				4.8	0.53						
104-142	0.14			0.5	2.80	1.70	TR	0.1	4.6				3.8	0.38						
142-178	0.16			0.4	3.30	2.40	0.1	0.1	5.9				4.3	0.37						

(A) COLLECTED 80 M WEST OF 8-4 IN AN OAT FIELD.

(B) ESTIMATED.

(C) ORGANIC CARBON IS 12 KG PER SQ M TO A DEPTH OF 1 METER (METHOD 6A).

(D) METHODS 6N4C FOR CA AND 6O4C FOR MG.

Soil classification: Typic Hapludalfs; fine-loamy, mixed, mesic .

Soil: Theresa .

Soil No.: 868WI-8-4 .

Location: Calumet County, Wisconsin; SE $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 21, T. 18 N., R. 20 E.; 150 feet north and 100 feet west of southwest corner of woodlot.

Climate: Climate is humid continental. Mean annual temperature ranges from about 47° to 51° F; mean annual precipitation is about 30 inches; frost-free season is about 135 days.

Vegetation and land use: Most of this soil, except for very stony areas, is used for growing general farm crops. Native vegetation was maple-basswood forest.

Parent material: Thin silt mantle (10 to 30 inches thick) over highly calcareous light loam to sandy loam glacial till.

Physiography: Gently undulating to hilly drumlins and glacial till plains.

Topography: On gently sloping ground moraine with a southwest aspect. Slope is 1 percent.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: R.B. Grossman, R.E. Fox - August 20, 1968.

(Colors are for field use; unless stated otherwise)

SOIL CLASSIFICATION-TYPIC HAPLUDALF
FINE-LOAMY, MIXED, MESIC
SERIES - - - - - WAYMOR TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE NRCS
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - S68WI-36-1 COUNTY - - - MANITOWOC

GENERAL METHODS- - - 1A, 1B10, 2A1, 2B

SAMPLE NOS. 68L1129-68L1135

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B										FAMLT				INTR		FIVE		NON-		RATIO	
		SAND	SILT	CLAY	FINE	CLAY	VCOS	CORS	MEDS	FVES	VFNS	COSI	FNSI	VFSI	TEXT	II	CLAY	CO3-	15-	8D1	15-	8D1	
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	.002	2-.1	.02	CLAY	TO	CLAY	BAR	TO	CLAY	
000-20	AP	30.2	61.6	8.2		1.1	2.6	5.5	11.7	9.3	34.7	26.9		20.9	50.1					8	.62		
020-28	A6B	33.6	50.4	16.0		1.3	3.3	6.4	13.7	8.9	25.5	24.9		24.7	41.5				16	.38			
028-46	2B21T	33.1	38.1	28.8	7.7	1.5	3.7	6.4	13.7	7.8	16.1	22.0		25.3	31.2	27			29	.35			
046-64	2B22T	39.8	39.6	20.6		3.0	5.2	7.5	15.2	8.9	18.4	21.2		30.9	35.4				21	.38			
064-91	2B3	51.7	37.2	11.1		2.6	5.3	8.7	20.9	14.2	19.8	17.4		37.5	46.0				11	.43			
091-130	2C1	50.9	40.2	8.9		3.3	5.2	7.4	20.2	14.8	21.7	18.5		36.1	48.3				9	.40			
130-170	2C2	50.9	41.4	7.7		3.9	5.3	7.2	19.9	14.6	21.3	20.1		36.3	47.3				8	.45			

DEPTH	PARTICLE SIZE ANALYSIS, MM, 38, 381, 382) (BULK DENSITY				WATER CONTENT				CARBONATE			
	WEIGHT																					
	VOL.	GT	75-20	20-5	5-2	LT	20-2	1/3-	JVEN	COLE	4A1D	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E	
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	CM	PCT	PCT	PCT	PCT	
000-20	1	0	0	1	1	74	2	1.42	1.45	.007				19.9	5.1	.21		0	0	7.0	6.3	
020-28	1	0	0	1	1	70	2	1.40A							6.1			0	0	7.0	6.3	
028-46	10	TR	10	TR	5	60	5	1.54	1.60	.012				15.8	10.1	.08		TR	0	7.2	6.6	
046-64	10	TR	15	TR	TR	55	2	1.70	1.78	.014				14.6	7.9	.10		2	0	7.6	6.8	
064-91	25	15	10	5	5	45	14	1.70A							4.8			24	0	7.9	7.1	
091-130	20	5	5	10	5	45	16	1.78	1.82	.006	17.0				3.6	.19		33	0	8.2	7.3	
130-170	20	15	5	10	5	45	15	1.86	1.90	.006	15.4				3.5	.18		34	TR	8.2	7.4	

DEPTH (ORGANIC) MATTER 3-1000 PHOS (EXTRACTABLE BASES FROM 1 ACTV 41 ACAT EMPH) BATIO BATIO 45 10000 DATA

DEPTH	ORGANIC		NITG	EXT	TOTL	CA	MG	NA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	CA	SAT	EXTB	NHAC
	CARB	FE																	
000-20	1.698	.128	13	0.8		8.0	2.5	0.1	0.1	10.7	3.6		14.3	10.4	1.30	3.2	77	75	103
020-28	0.74	.055	13	1.1		7.3	2.6	0.1	0.1	10.1	3.6		13.7	10.0	0.63	2.8	73	74	101
028-46	0.68	.065	10	1.5		10.6C	3.9C	0.1	0.3	14.9				16.6	0.58				
046-64	0.55	0.049	11	1.3		8.6C	3.2C	0.1	0.2	12.1				12.2	0.59				
064-91	0.23			0.7		4.8C	1.9C	0.1	0.1	6.9				5.9	0.53				
091-130	0.16			0.5		3.0C	1.5C	TR	0.1	4.6				3.9	0.44				
130-170	0.16			0.5		3.1C	1.6C	0.1	0.1	4.9				3.8	0.49				

DEPTH (SATURATED PASTE) NA NA SALT GYP (SATURATION EXTRACT 8A1- ATTERBERG

Soil classification: Typic Hapludalf; fine-loamy, mixed, mesic.

Soil: Waymor taxadjunct*.

Soil No.: 868WI-36-1.

Location: Manitowoc County, Wisconsin; SW $\frac{1}{4}$, SE $\frac{1}{4}$, Sec. 13, T. 21 N., R. 22 E.; 300 feet north of county park road and 400 feet west of woodlot.

Climate: The climate is humid continental. Mean annual temperature ranges from 45° to 47° F; mean annual precipitation ranges from 26 to 32 inches, and the frost-free season is about 135 days.

Vegetation and land use: Native vegetation was mixed hardwoods, predominantly maple, basswood, beech, oak, yellow birch, and elm. About 80 percent of this soil is cultivated or in pasture. Corn, oats, and legume hay are the principal crops.

Parent material: Calcareous loam and sandy loam glacial till with a thin silt mantle.

Physiography: Gently sloping to moderately steep plane and convex slopes on glacial ground moraines.

Topography: Site is on a convex slope of 2 percent with a southeast aspect.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate

Described by: Robert Fox, Ernest Link, Howard Lorenz, August 21, 1968.

(Colors are for moist soil unless otherwise stated)

Ap 68L1129 0 to 20 cm (0 to 8 inches). Very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable when moist; common roots; much earthworm activity (casts and holes); neutral; abrupt smooth boundary.

A&B 68L1130 20 to 28 cm (8 to 11 inches). Dark brown (10YR 4/3) silt loam; weak fine subangular blocky structure parting to weak fine granules; friable when moist; common roots; few pebbles and earthworm casts; neutral; abrupt wavy boundary.

IIB21t 68L1131 28 to 46 cm (11 to 18 inches). Reddish brown (5YR 4/4, crushed) clay loam; moderate fine angular blocky structure; firm when moist, hard when dry; thick continuous clay films with dark reddish brown (5YR 3/4) colors; 1 percent of volume composed of stones over 3 inches in diameter and 5 percent of stones 3/4 to 3 inches in diameter; common roots; mildly alkaline; gradual wavy boundary.

IIB22t 68L1132 46 to 64 cm (18 to 25 inches). Dark reddish brown (5YR 3/4, crushed) clay loam; moderate fine angular blocky structure; firm when moist; thick continuous clay films with dark reddish brown (5YR 3/3) colors; 1 percent of volume composed of stones over 3 inches in diameter and 10 percent of stones 3/4 to 3 inches in diameter; many of the stones are partly weathered dolomite; common roots; mildly alkaline; clear wavy boundary.

IIB3 68L1133 64 to 91 cm (25 to 36 inches). Brown (7.5YR 5/4) loam; weak fine subangular blocky structure; friable when moist; 10 percent of volume composed of stones over 3 inches in diameter and 5 percent of stones 3/4 to 3 inches in diameter, most of them are dolomite and partly weathered; common roots; mildly alkaline; gradual wavy boundary.

IIC1 68L1134 91 to 130 cm (36 to 51 inches). Brown (7.5YR 5/4) heavy fine sandy loam; weak fine fragmental blocks; friable when moist; 5 percent of volume composed of stones over 3 inches in diameter and 5 percent of stones 3/4 to 3 inches in diameter; a few bright chroma mottles, and spots and streaks of free carbonates; few roots; strong effervescence.

IIC2 68L1135 130 to 170 cm (51 to 67 inches). Brown (7.5YR 5/4) heavy fine sandy loam; weak fine fragmental blocks; friable when moist; 10 percent of volume composed of stones over 3 inches in diameter and 3 percent of stones 3/4 to 3 inches in diameter; few bright chroma mottles, and streaks of free carbonates; strong effervescence.

Remarks: Soil nearly dry in solum and moist in substratum when sampled. The glacial till is bordering on loam texture with a moderate to high carbonate content. Original vegetation consisted of mixed hardwood with occasional scattered conifers. In the past this soil was included in with the Miami series but is now considered outside of the range as presently defined.

Soil temperature: At 10 inches - 20.0° C.
20 inches - 19.5° C.
40 inches - 17.0° C.

*This pedon lacks tongues of albic material in the argillic horizon; therefore, it is a taxadjunct to the Waymor series.

SOIL CLASSIFICATION-TYPIC HAPLUDALF
FINE-LOAMY, MIXED, MESIC
SERIES - - - - - WAYMOR TAXADJUNCT

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE HRTSC
SOIL SURVEY INVESTIGATIONS UNIT
LINCOLN, NEBRASKA

SOIL NO - - - - - 568W1-36-2 COUNTY - - - MANITOWOC

GENERAL METHODS- - - 1A, 1B1B, 2A1, 2B

SAMPLE NOS. 68L1136-68L1143

DEPTH	HORIZON	PARTICLE SIZE ANALYSIS, LT 2MM, 3A1, 3A1A, 3A1B													RATIO			
		SAND			SILT			CLAY			FAMEL			INTR	FINE	NDN	BDI	
		SAND	SILT	CLAY	CLAY	VCOS	CDRS	MEDS	FVES	VFNS	COSI	FNSI	VFSI	TEXT	II	CLAY	CO3-	15-
		2-	.05-	LT	LT	2-	1-	.5-	.25-	.10-	.05	.02	.005-	SAND	.2-	TJ	CLAY	801
CM		.05	.002	.002	.0002	1	.5	.25	.10	.05	.02	.002	.002	2-.1	.02	CLAY	PCT	TO

DEPTH	HORIZON	38.5	53.4	8.1	.8	2.0	4.4	17.2	14.1	31.5	21.9	24.4	56.5	8	.64
000-018	AP														
018-28	A2	42.4	52.0	5.6	.9	2.8	5.8	18.0	14.9	31.2	20.8	27.5	57.0	7	.50
028-38	2B1	44.3	38.9	16.8	2.0	4.5	8.0	18.8	11.0	19.4	19.5	33.3	40.9	17	.33
038-61	2B21Y	39.4	33.8	26.8	2.1	3.6	6.6	17.0	10.1	16.2	17.6	29.3	35.8	27	.35
061-89	2B22Y	47.5	33.7	18.8	1.7	4.0	7.3	20.3	14.2	17.8	15.9	33.3	43.8	19	.37
089-119	2B3Y	40.2	40.9	18.9	2.3	4.0	5.7	15.7	12.5	20.6	20.3	27.7	42.1	19	.40
119-147	2C1	46.8	39.8	13.4	4.5	5.9	7.2	17.8	11.4	18.8	21.0	35.4	40.0	13	.38
147-173	2C2	60.1	32.1	7.8	6.1	7.4	11.0	23.0	12.6	17.2	14.9	47.5	42.3	8	.38

DEPTH	PARTICLE SIZE ANALYSIS, MM, 38, 381, 382										BULK DENSITY				WATER CONTENT				CARBONATE				PH	
VOL. (%)	WEIGHT (%)										4A10	4A1H	4D1	4B1C	4B1C	4B2	4C1	6E1B	3A1A	8C1A	8C1E			
GT	GT	75-20	20-5	5-2	LT	20-2	1/3-	OVEN	COLE	1/10	1/3-	15-	WRD	LT	LT	1/1	1/2							
2	75				.074	PCT	BAR	DRY	BAR	BAR	BAR	BAR	CM/	2	.002	H2O	CALC							
CM	PCT	PCT	(- - -)	PCT	LT 75 -	(- - -)	1120	G/CC	G/CC	PCT	PCT	PCT	CM	PCT	PCT									

000-018	TR	0	0	TR	TR	70	TR	1.45	1.49	.009		20.1	5.2	.22		0		7.0	6.5
018-28	1	0	0	1	1	65	2	1.58	1.59	.002	19.1		2.8	.26		0		7.0	6.2
028-38	2	0	0	1	1	60	2	1.67	1.69	.004		12.3	5.6	.11		0		6.7	5.8
038-61	15	15	10	TR	TR	55	3	1.49	1.60	.020		16.8	9.4	.09		TR	0	7.3	6.8
061-89	15	15	5	5	TR	50	8	1.48	1.57	.017		19.1	6.9	.15		18	0	7.9	7.1
089-119	4	0	0	6	1	62	7	1.58	1.64	.012		17.1	7.6	.14		22	0	7.9	7.3
119-147	15	5	5	10	5	50	11	1.87	1.90	.005		13.6	5.1	.14		35	0	8.2	7.5
147-173							19						3.0			39	0	8.2	7.5

DEPTH (ORGANIC MATTER)			IRON	PHOS	(- -EXTRACTABLE BASES 5B44- -)					ACTY	AL	(CAT	EXCH)	RATIO	RATIO	CA	(BASE	SAT)	
6A1A	6B1A	C/N	6C2A	6S1A	6N2E	6O2D	6P2A	6Q2A		6H1A	6G1D	5A3A	5A6A	BD1	BD3	5F	5C3	5C1	
ORGN	NITG		EXT	TOTL	CA	MG	VA	K	SUM	BACL	KCL	EXTB	NHAC	NHAC	TO	TO	SAT	EXTB	NHAC
CARB			FE						EXT8	TEA	EXT	ACTY			CLAY		ACTY		
CM	PCT	PCT	PCT	PCT	PCT	PCT	PCT	PCT	MEQ	/ 100	G-					MG	PCT	PCT	PCT
000-018	1.91A		0.7		7.6	2.9	0.1	0.3	10.9	3.6		14.5	10.0	1.22	2.6	76	75	109	

000-018	L-91A			0.7	7.6	2.9	0.1	0.3	10.9	3.6			14.5	10.0	1.20	2.6	76	75	109
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Soil classification: Typic Hapludalf; fine-loamy, mixed, mesic.

Soil: Waymor taxadjunct*.

Soil No.: 68L1136-2.

Location: Manitowoc County, Wisconsin; SW $\frac{1}{4}$, SW $\frac{1}{4}$, Sec. 10, T. 21 N., R. 22 E.; 140 feet east of road and 60 feet south of field boundary.

Climate: The climate is humid continental; mean annual temperature ranges from 45° to 47° F; mean annual precipitation ranges from 26 to 32 inches; and the frost-free season is about 135 days.

Vegetation and land use: Native vegetation was mixed hardwoods, predominantly maple, basswood, beech, yellow birch, and oak. About 80 percent of this soil is cultivated or in pasture. Corn, oats, and legume hay are the principal crops.

Parent material: Calcareous loam on sandy loam glacial till with a thin silt mantle.

Physiography: Gently sloping to moderately steep plane and convex slopes on glacial ground moraine.

Topography: Site is on a 3 percent convex slope with a southwest aspect.

Drainage: Well drained.

Ground water: Deep.

Erosion: Slight.

Permeability: Moderate.

Described by: R. Fox, E. Link, H. Lorenz, Aug. 21, 1968.

(Colors are for moist soil unless otherwise stated)

Ap 68L1136 0 to 18 cm (0 to 7 inches). Very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; common roots; mildly alkaline; abrupt smooth boundary.

A2 68L1137 18 to 28 cm (7 to 11 inches). Brown (10YR 5/3) silt loam; weak medium platy structure; friable when moist; common roots; moderately alkaline; clear wavy boundary.

IIB1 68L1138 28 to 38 cm (11 to 15 inches). Reddish brown (5YR 4/4, crushed) loam; weak fine subangular blocky structure; friable when moist; silt coatings (skeletans) grayish brown (10YR 5/2) on peds; common roots; moderately alkaline; clear wavy boundary.

IIB2t 68L1139 38 to 61 cm (15 to 24 inches). Reddish brown (5YR 4/4, crushed) clay loam; moderate fine angular blocky structure; firm when moist; thick continuous clay films with dark reddish brown (5YR 3/4) colors on faces of peds; 10 percent of volume composed of stones over 3 inches in diameter and 5 percent of stones 3/4 to 3 inches in diameter; common roots; neutral; gradual wavy boundary.

IIB2t 68L1140 61 to 89 cm (24 to 35 inches). Reddish brown (5YR 4/4) clay loam; weak fine angular blocky structure; firm when moist; thick continuous clay films on faces of peds with reddish brown (5YR 4/3) color; 10 percent of volume composed of stones over 3 inches in diameter and 3 percent of stones 3/4 to 3 inches in diameter; many of these are partially weathered dolomite; common roots; moderately alkaline; gradual wavy boundary.

IIB3t 68L1141 89 to 119 cm (35 to 47 inches). Dark brown (7.5YR 4/4) light clay loam; weak medium angular blocky structure; friable when moist; thin patchy clay films on faces of peds; common roots in upper 6 inches becoming few below; moderately alkaline; clear wavy boundary.

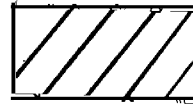
IIC1 68L1142 119 to 147 cm (47 to 58 inches). Brown (7.5YR 5/4) loam; weak medium fragmental blocks; friable when moist; 5 percent of volume composed of stones over 3 inches in diameter and 3 percent of stones 3/4 to 3 inches in diameter; few spots and streaks of free carbonates; strong effervescence.

IIC2 68L1143 147 to 173 cm (58 to 68 inches). Brown (7.5YR 5/4) light loam; weak medium fragmental blocks; friable when moist; 5 percent of volume composed of stones over 3 inches in diameter and 3 percent of stones 3/4 to 3 inches in diameter; spots and streaks of free carbonates; strong effervescence.

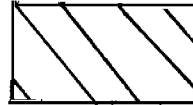
Remarks: Soil nearly dry in solum and moist in substratum when sampled. The glacial till is believed to be a light loam but contains pockets of sandy loam. It has a moderate to high carbonate content. Original vegetation was dominantly mixed hardwood with scattered conifers. In the past, this soil was included with the Miami series but is now considered to be outside the range of characteristics called for in the Miami.

Soil temperature: At 10 inches - 21.5° C.
20 inches - 19.5° C.
40 inches - 17.0° C.

*This pedon lacks tongues of albic material in the argillic horizon; therefore, it is a taxadjunct to the Waymor series.



SSIR No. 17



SSIR No. 34



SSIR No. 17 & 34

